

**An Investigation of Computer Technology Instruction in the
Intermediate Grades 4 to 7**

By

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**A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of
Master of Arts**

In the Department of Curriculum and Instruction

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Abstract

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This study focused on the quality of the technology program in the intermediate grades in one British Columbia school district. The research questions focused on teachers' understanding and needs with respect to educational technology, along with their ideas and practices concerning the teaching of technology at the intermediate level (grades 4 to 7). The survey questions focused on the following: which skills teachers were teaching in grade 4 to 7 computer classrooms; the methods used by them in presenting these skills; the teachers' comfort levels with their personal computer skills, and with teaching computers; and, whether all students received the same level of skills at their grade level. Responses to those questions, through teacher questionnaires and lab administrator interviews, supplied the data for analysis. Sixty-six teachers participated by returning the questionnaire which represented a 32% return rate. Seven interviews were also conducted with six current and one previous lab administrator. The method used in analyzing the data was a descriptive study that synthesized data both qualitatively and quantitatively. The results identified that the majority of the teachers were using word processing, Internet, instructional games, and typing programs as the main applications within their technology program. Lab administrators and some teachers made comments that identified teachers' needs, which included training, support, and funding. The teachers' training workshop focus was on skill building for the teachers while integration and the future of technology in the classrooms was the lab administrators' focus. The literature and the lab administrators identified that there were two types of training. The first was workshops on the building skills and confidence in the use of technology. The other was workshops on integration strategies to incorporate the applications into

teachers' current teaching styles. The lab administrators also identified the perceived benefits and barriers to using computer technology for both the teachers and the students. The results lead to recommendations for improving the technology education program for district students.

Table of Contents

Abstract	ii
Table of Contents	iv
List of Tables	vii
List of Figures	viii
Acknowledgement	ix
Dedication	x
Chapter One: Introduction	1
Purpose	5
Rationale	6
Research Questions	7
Chapter Two: Review of Related Literature	9
Learning theories	9
Benefits to teaching and using technology.....	10
Barriers	13
Uses of technology	16
Teacher training	18
How to integrate technology into classroom activities	21
Chapter Three: Research Methodology	26
Population and sample	26
Procedure	27
Description of instruments	28
Teacher’s questionnaire instrument description.....	29
Lab administrators interview instrument description	31
Data analysis method	32
Chapter Four: Data Analysis	33
Teacher Questionnaire Data Analysis	33
Demographics of the teachers who responded to the questionnaire	34
1. What grade do you teach?	34
2. Do you have access to the “District Draft Scope and Sequence” for Technology document? Yes, No, or Have Never Seen One	35

3. Are you using the Scope and Sequence this year to plan your computer program? Yes or No	36
4. How long have you been teaching?	36
5. What would you say is your comfort level on the computer?	36
6. Where is your comfort level in teaching computers at the elementary level?	38
7. Do you have any training in computer technology?	40
8. Do you teach computers at the grade 4 to 7 levels?	42
9. Why do you not teach computers?	42
Workshop interests of the teachers who responded to the questionnaire	44
10. Would you like to attend workshops for activities/training on how to integrate computers into your classroom?.....	44
11. What type of workshops would you like to be a participant in?.....	44
12. Which type of presentation of workshop would best suit you?.....	45
13. Would you like to see a stand alone technology 4 to 7 curriculum for the province?	48
Programs and skills taught by the teachers who responded to the questionnaire	49
14. What programs have you used or are going to use in your computer classroom this year?	49
15. What types of strategies do you use when teaching computers?.....	50
16. Fill in all the boxes that apply to what you teach when working on each of the below programs.	50
General	50
Touch typing	50
Word Processing	53
Internet	53
Drawing and Painting Programs	55
PowerPoint or Multimedia Presentation such as Hyper Studio or Web Pages	55
Spreadsheets such as Excel or Works	56
Database	56
17. Please use the space provided to include any additional comments regarding computer use in the elementary schools.....	56
Lab Administrator Interview Data Analysis	60
Demographics	61
1. How long have you been a lab administrator?	61
2. How long have you been teaching?	61
3. What would you say is your comfort level on a computer?	61
4. What are the grade levels of the students you work with?	61
Impact and potential of computers in the classroom	62
5. Do you feel that there should be a stand-alone curriculum established for technology at the elementary grade levels? Yes or No. If yes, should the curriculum be province wide or district wide? Explain.....	62

6. What impact have computers had on your teaching?.....	64
7. What impact has the computers had on the students?.....	67
8. What are the benefits of integrating computers with your program?.....	69
9. What would you like to see happen with the technology program?.....	71
10. How do you integrate computers within your classroom?	73
11. How would you like to learn more about computers? If workshops, what workshops would you like to attend and what would you like to see in them?	75
12. Are there any barriers for teachers as to using computers in the school? What are they?	77
13. Are there activities that you would like to do but cannot? Why?.....	79
14. Anything else you would like to include	81
 Chapter Five: Discussion	 83
Demographics	84
Stand alone Curriculum and Scope and Sequence	85
Training	86
Computer uses	88
Benefits to Students and Teachers	89
Barriers for Teachers and Teaching Computers	90
Conclusion	92
Recommendation	93
 References	 95
 Appendix A: Letter of Initial Contact to the Superintendent	 99
 Appendix B: Consent Letter from School District	 101
 Appendix C: Teacher Questionnaire Consent Letter	 102
 Appendix D: Lab Administrator Information	 103
 Appendix E: Teacher's Questionnaire	 105
 Appendix F: Lab Administrator Interview Questions	 127
 Appendix G: Tables and Figures	 147
 Appendix H: Human Research Ethics Board Certificate of Approval	 155

Tables

Table 1: Teachers not interested in attending workshops compared to their grade level, years of experience and the comfort level teaching and using computers.....	147
Table 2: Number of responses to each workshop by the number of rated responses	46
Table 3: Teacher's reported preferences for workshop presentation and the number of responses per choice	47
Table 4: Programs (applications) used by the percent of teacher per grade level.....	148
Table 5: Teaching strategies used by the percentage of teachers per grade level	51
Table 6: General skills taught by the percent of the teachers per grade level	52
Table 7: Touch typing taught by the percent of the teachers per grade level	54
Table 8: Word processing skills taught by the percent of teachers per each grade level	150
Table 9: Internet skills taught by the percent of teachers per grade level	151
Table 10: Drawing and Painting skills taught by the percentage of teachers at each grade level	152
Table 11: PowerPoint skills taught by the percentage of the teachers per grade level	153
Table 12: Spreadsheet skills taught by the percentage of the teachers per grade level	154

Figures

Figure 1. Grade level of teachers who responded to the questionnaire	35
Figure 2. Teachers' comfort level when using computers and the grade level average	37
Figure 3. Teachers' comfort level when teaching computers and the grade level average	39
Figure 4. Teachers' comfort level using computers in relation to the teachers' comfort level of teaching computers.....	40
Figure 5. Percentage of teachers who attended computer training	41
Figure 6. Teacher's reasons for not teaching computers	43
Figure 7: The number of teachers who responded compared to the teachers' comfort level with using and teaching computers.....	149

Acknowledgements

There are many people to acknowledge in the preparation of this paper. The School District for allowing me the opportunity to gather information, the teachers and lab administrators who took time out of their already busy schedules to respond to the questionnaires and to volunteer for interviews. Without this support and feedback the project would have been impossible. Thanks to those who previously wrote and published articles on computers. To the University of Victoria sponsors who gave advice and guided me in this paper. Thanks to my family for their continual support and encouragement this past year. A special thank you to Leona Kyrytow who spent hours editing and reshaping the information. Thanks to everyone who believes in quality computer education.

Dedicated to my nephew, Tyler

Your enjoyment when exploring
educational games inspired me
to write this paper.

Chapter 1

Introduction

“This is great!” “When do we get to use computers again?” “Do you come in and teach us computers today?” Comments such as these reach the ears of the teacher everyday, and the researcher hears these comments on a regular basis. “Do we have to log off?” “Can’t we stay and continue with this?” “Is our class over, already?” Students want to continue exploring and discovering what computer technology has to offer. Whitehead (1967) stated that without interest there cannot be mental development and “[teachers] may endeavour to excite interest by means of birch rods, or [they] may coax it by the incitement of pleasurable activity. But without interest there will be no progress (p. 31).” Students are interested in discovering what technology has to offer, and now is the time to explore while students still have that interest.

Observing students enjoying and discovering what technology has to offer can be a very fulfilling feeling. Students live in the world of technology and employers are expecting students to understand how the different technologies work. Technologies such as computers are advancing on a daily basis, and yet when students come to school, they may only work on computers one hour a week. What are the students doing with that one hour per week? Are students able to “experience the joy of discovery” (Whitehead, 1967, p.2)?

The late 1970s and early 1980s began an era when computer technology entered the schools. High schools offered courses on how to write languages such as Beginners All-Purpose Symbolic Instruction Code (BASIC), A Programming Language (APL), and Formula Translator (FORTRAN). The next 10 to 15 years the momentum for technology

grew; elementary schools also entered the technology field. In the late 1980s and early 1990s large amounts of money went into purchasing computer technology. School districts and individual schools spent money on hardware such as computers and printers, and software, such as instructional computer programs and CD ROMs with instructional games and encyclopaedias.

Today, schools across British Columbia not only have access to computers in their school, but they also have access to the Internet applications such as email and web browsers. The Internet became popular in the mid 1990s, and with the advancement in computer technology, there began a growing interest in what schools could do to teach students about computers. Technologically literate teachers are now using the email for communicating with parents and colleagues within the school district and around the world, and the Internet for gathering information such as researching topics, visiting museums, or watching visual tours. These visual tours could include tours around cities, allowing students to explore, the Egyptian Pyramids, the Eiffel Tower, or any historic or architecturally significant place. In science, students can also have the opportunity to observe and experience a dissection without having to destroy a life.

The introduction of computers into the elementary classroom over the last 10 to 15 years has created a different working environment for teachers. Ministries of education and school districts have expected teachers to teach computer skills. Most teachers who had completed their teacher training prior to the mid 1990s did not receive computer training. University training programs did not generally require or offer computer related courses, so most teachers were unprepared to teach students the use of computers. The researcher completed her teacher training in 1994, receiving only a

couple of two-hour classes on how to create worksheets. The requirement that teachers receive training became necessary, as there was an expectation for technology use and integration within the classroom. Many teachers seized the opportunity to develop the skills by attending training sessions, while others did not have the same experiences. Others were not familiar or comfortable enough with the use of computers so they were left behind. Still today, not all teachers are comfortable using computers.

In the early years of computer instruction in the schools, computer use focused on programming. Students learned how to use a computer by using a specific program language while creating a project. For example, a student may have been asked to use a programming language to create a game that had a user play against the computer, such as a Tic Tac Toe game.

As new technologies and software became available, there was a shift in thinking, and the use of computers moved from using the computer to write code, to activities that helped students develop their skills such as drill and practice software programs. For example, the students used multiplication games that developed their skills as they memorized the times tables. As more technology was developed and made available to students at home and at school, there began a movement for teachers to teach computer use by integrating the technology into the curricula. Methods suggested to do this included project work and collaboration with other students in class, or elsewhere in the world. With this new technology arriving in school, there were also suggestions that the traditional teacher centered strategies were no longer successful when integrating computers into the curriculum.

Finally, and appropriately, the application of computer technology in schools is shifting toward the use of computer technologies and applications as authentic tools to support the exploration of curricular ideas, issues and contexts. While the introduction of new technology skills in isolation may typically be accompanied by an apparent increase in student interest and participation, these effects are generally transient. In contrast, the authentic application of appropriate technologies in rich contexts should yield transferable learning, lasting engagements and intrinsic motivation.

In British Columbia, the curriculum is divided into subjects and an Integrated Resource Package (IRP) produced for each. Each IRP is further divided into grade levels and a number of learning outcomes are identified for the teachers to cover at each grade level. The IRP also includes suggestions for teaching the learning outcomes, recommending resources, and suggesting assessment strategies.

An Information Technology (IT) IRP was created in 1996 to support the training of students on technology. Then in 2002, as the emphasis in technology shifted away from technology as a stand alone subject and toward technology as an authentic tool, the IT IRP was de-listed but retained as a resource document. The Ministry of Education removed the document from the status of 'required' to be taught in every classroom in the province, to the status of a resource for teachers to use, if they so chose. The focus shifted away from technology as a subject to technology as a tool to be integrated within the learning outcomes of other subject IRPs. Traditional subject IRPs are still evolving to include explicit applications of technology along with implementing technology use. Along with the de-listing of the IRP for IT, there was a decrease in the funding and support for technology integration.

A number of school districts developed a scope and sequence for teaching computer skills to elementary students. The scope and sequence was intended to provide constant progression of experiences and skills from kindergarten to grade 7 or higher. The school district, used for this research, developed a draft scope and sequence for information technology from kindergarten to grade ten. This scope and sequence identified basic skills, such as turning on a computer and launching programs, to more advanced skills such as developing PowerPoint presentations, word processing, Internet searches, databases, and spreadsheets. There was a variety of levels in between the basic and the advanced skills and students would continue to develop their skills over time while using computer technology.

Purpose

The purpose of this study was to investigate teachers' understanding and needs with respect to educational technology, along with their ideas and practices concerning the teaching of technology at the intermediate level (grades 4 to 7). By understanding the needs of the teachers, a plan could be established to strengthen the technology program within the intermediate classroom. The researcher became interested in the topic when witnessing the elation and excitement of the students when exploring technology. The researcher also wanted to discover teachers' interests in workshop topics or skills, in order to prepare workshops.

The study compared the skills taught at each grade level with the teachers' comfort level using and teaching computers. This study identified the strategies that teachers used when teaching computers. It also identified teachers' previous training and examined teachers' interest in further training. The interview questions for the lab

administrators addressed the impact that computers had on students, teachers, and teaching as well as the barriers to using computers in the elementary classroom.

Classroom teachers throughout the district, currently teaching grades 4 to 7, received questionnaires. Current lab administrators received letters asking for interview volunteers. Both the questionnaire and the interviews asked questions about the skills teachers were teaching while using technology. The questionnaire and the interview process were both voluntary, therefore the people who responded were most likely those who had the time to complete the questionnaire or interview and were interested in the topic. One limitation of this research was that teachers who were not interested in this topic did not respond to the questionnaire. Therefore, the data related to what some teachers were teaching at the grade 4 to 7 levels. Another limitation was the wording of the questions, as there was no place for a teacher to clarify a response, and each teacher's interpretation affected the responses. A third limitation to this research was that there was no comparison with other districts in the province, meaning that the data and results will be most relevant to this school district. Finally, the technology that was available in the different schools affected teachers' responses to questions. If the teacher in the school did not have access to a particular application, such as PowerPoint, they were unable to teach the software and may have been unable to respond to the relevant questions.

Rationale

The district chosen for this study has thirty-three elementary schools ranging from two hundred to four hundred and fifty students in size. Two schools in the district only enrol students from kindergarten to grade 3 so were not included in the study. Therefore, teachers and lab administrators in 31 schools were asked to participate. Each lab consists

of a variety of computers and software. Some computer labs are running high tech (modern) equipment with current software, while other computer labs are functioning with extremely outdated or minimal systems. The variety in computer equipment makes it difficult to set up a specific curriculum for computer technology.

There is an ongoing push to upgrade older computers and replace them with newer equipment, although the process is slow. The computer technicians' priorities are to make sure the computer labs at the high schools are running; therefore, the elementary school labs receive service when time permits.

It is hoped that the results of this project will inform teachers about strategies and techniques that other teachers are using with computers, what technologies are most effective, and how to access necessary support. The research findings will give the district input about the issues needing to be addressed when incorporating technology into the current system. The study provides information for workshop presenters on the types of workshops that teachers were interested in attending. Finally, it may also provide ideas and suggestions that will encourage and support equality so that all students receive an equal opportunity to experience an appropriate level of technology instruction, regardless of the school attended.

Research Questions

The research questions focused on teachers' understanding and needs with respect to educational technology, along with their ideas and practices concerning the teaching of technology at the intermediate level (grades 4 to 7). Computers can have a very positive effect on students and teaching. The researcher wanted to explore two concepts: what is taught in the intermediate grade 4-7 technology program, and then

make suggestions based on the findings, as to methods for making the elementary program effective and engaging for all students. The findings also lead to suggestions for technology education offerings at professional development conferences. The recommendations and findings could also be applied to teacher education programs. It is hoped that by helping teachers to become more computer literate, they may see the potentials associated with the applications of technology in the classroom.

Chapter 2

Review of Related Literature

The literature review comprises six sections on technology use in the classroom. The first section is a brief discussion on the traditional and constructivist learning theories. The next section is the benefits of computers to both students and teachers. The third section identifies the barriers preventing teachers from using technology to the fullest potential, such as teacher training, access to computer time, district support, technology support, and the technology itself. The next section identifies the uses of technology in the classroom. After that, there is a discussion on teacher training by identifying the developmental stages a teacher would experience, and the need for continued support. The last section addresses the five best practices of teaching technology integration, as well as a role change for teachers.

Learning Theories

The traditional teacher centered approach involves a teacher who lectures and has students practicing drills, memorizing, and mimicking the material. This traditional approach presents obstacles for teachers and students in getting the full benefits of what technology has to offer. The strategies suggested by the constructivist theory emerged as one approach for teaching technology. Dias (2001) stated that the constructivist theory is a student centered approach to learning. The approach incorporates experiential, authentic, and collaborative learning, as well as problem oriented activities, which are integrative and interdisciplinary in nature.

Nulden (2001) described an “e-ducation framework” that combines constructivist, collaborative, problem based, and experiential learning along with learning assessments.

Constructivist learning encourages learners to be active participants in the learning process and to construct knowledge through interaction with the learning environment. Collaborative learning encourages learners to work together to construct learning by communicating their understandings, and building the knowledge of the group participants. Problem based learning allows each participant to have input into the learning process. The problems used are real and may occur in the learner's life. Experiential learning allows the learner to experience a situation in a safe environment and reflect on the experience with others. Assessment of learning depends on the expectations of the activity. Two types of assessment are involved. Formative assessment encompasses the process of learning from beginning to end and considers the learning process, while summative evaluation uses a test at the end to identify the information learned. The activity would determine the process of assessment. The e-ducation framework engages learners in the learning process, empowers students by distributing responsibilities to the individual learners, and includes electronic learning using technology. The framework is an integrative approach to learning and encompasses thematic learning and participation.

Benefits to teaching and using technology

The literature identifies the benefits to students who use technology in the schools. Hancock and Betts (1994) suggest that the benefits include a role shift in which teachers act as coaches and guide students to work collaboratively in small groups. Enwefa, S. and Enwefa, R. (2002) identify the benefits of working cooperatively on a community, national and global level enabling the students to become critical thinkers and problem solvers. Duhaney and Zemel (2000) also suggest that when students work

collaboratively together, it fosters a cooperative environment rather than a competitive environment. Peck and Dorricott (1994) identify problem solving skills, higher level processing skills, and communication skills as benefits to using technology with students.

Medina, Pigg, Dresler, & Gorospe (2001) suggest that email would allow students to feel comfortable to voice their opinions and demonstrate their knowledge, and Yaghi (1996) concludes that technology learning would build self-confidence in students. Duhaney and Zemel (2000), Ertmer, Addison, Lane, Ross, and Woods (1999), Franklin (2004), Kleiman (2000), Maier (2002), Medina et al., Peck and Dorricott (1994), and Yaghi all state that computers are a motivational tool for students. Peck and Dorricott suggest that students are comfortable with technology tools. Duhaney and Zemel believe that students are actively involved in the process of learning, as it is exciting to use technology. Maier indicates that students are eager, interested, involved, and have fun while learning. Peck and Dorricott claim that students have opportunities to do meaningful work so they become engaged in learning.

Kleiman (2000) and McCannon and Crews (2000) claim that technology enhances learning experiences. Kleiman also claims that technology learning materials are visually rich and capture students' interests allowing students to engage in learning as they can gain access to information that is of personal interest. Hancock and Betts (1994), Kleiman, and Peck and Dorricott (1994) all identify that technology provides access to a wealth of information not always readily available elsewhere. Peck and Dorricott state that the students discover and construct new knowledge using technology and have opportunities to get beyond what the traditional education system has to offer. Kleiman also claims that technology provides students with opportunities to develop their

strengths and learning styles. The strengths and learning styles of students all develop at different times and technology allows students opportunities that are engaging and that meet their needs. Ertmer et al. (1999), Kleiman, and Peck and Dorricott all identify that individualization and meeting the needs of the students is a benefit to using technology. The skills developed while using technology prepare students for the workplace and the future. Word processing, information gathering such as databases and Internet searches, numeracy and literacy skills, problem solving, analyzing, cooperative, and collaborative learning are some of the skills that develop during computer classes. These are all important benefits for students and education.

The literature reports that the benefits to teachers are many and that technology becomes a powerful tool when used to its potential. Teachers create and develop activities that allow technology use to enhance teaching and learning. Hancock and Betts (1994) claim that technology allows teachers to individualize instruction, and a reduction of paperwork can be a result, allowing more time for teachers to work with students. Technology also allows for different learning styles and independent work. Franklin (2004) concludes that three quarters of the teachers claim there is a huge potential for technology in the classroom, as students have the opportunity to discover and create knowledge for themselves. Kleiman (2000) claims that technology allows teachers to have the opportunity to develop and strengthen their teaching approaches. When a teacher is comfortable teaching using the lecture style of teaching, that teacher can use technology to enhance the lesson with visual aids. Ertmer et al. (1999) suggest that technology allows teachers access to more interesting materials and direct interaction

with the technology for presentation of the material. The lessons become more interesting to the students and create an enhanced learning environment.

McCannon and Crews (2000), Medina et al. (2001), and Peck and Dorricott (1994), all identify communication as a benefit. The communication includes interaction with colleagues around the world, parents, and the community. Peck and Dorricott state that technology allows for individual learning as teachers have access to students' academic information quicker. Ertmer et al. (1999) identify benefits on a personal level, as teachers suggest that through increasing their comfort level with technology, they began to enjoy learning and using the technology.

Barriers

Technology is a powerful tool when used to enhance learning, although, there are also negative sides to using technology. Kleiman (2000) describes that playing mindless games, accessing inappropriate materials and isolating students are a few negative reactions to using technology. Technology use in education has many benefits although there are many barriers that prevent teachers and students from using technology tools to their full potential. The literature identifies the barriers as lack of teacher training, time, district support, technology support, and the technology itself.

Many authors identify the lack of teacher training as a barrier to technology integration. McCannon and Crew (2000) claim that there is a limited use of computers during classroom instruction with teachers who have average or below average computer knowledge, in comparison to teachers who have a higher average of computer knowledge. They also state that the high level of anxiety would decrease with proper training. Carter (1997), Ertmer et al. (1999), Kleiman (2000), O'Neil (1995), Wilson,

Notar, and Yunker (2003), and Yaghi (1996), all indicate that lack of teacher training is a barrier. Carter indicates that one administrator within the study found that limited knowledge causes more problems, and requires more time to fix the problems. Yaghi claims that untrained teachers may possibly provide a negative experience for students, and the students may then develop a negative attitude towards technology. Hannafin and Savenye's (1993) literature review states that the failure to effectively change the education system is due to the teachers' inability to change their teaching styles to meet the needs of the technology. When technology training is available to staff, some staff resist the opportunity. Possibly teachers feel uncomfortable about the technology and the necessary changes needed in their teaching styles, states Ertmer et al. as well as Hannafin and Savenye.

Another barrier to technology use in the classroom is the amount of time required to learn and use the technology. To develop technology skills, an individual must have time to practice the technology. Jun (2004) found that more time on the computer increases each teacher's abilities. O'Neil (1995) identifies that there is slow progress toward technology integration when time is not available for training, trying out the technology, and discussing with other colleagues.

A third barrier is the lack of district support. O'Neil (1995) claims that a large barrier is the lack of a district's vision and clarity to that vision. Holland (2001) claims a financial investment that supports teacher training, the use and implementation of technology, and a vision that supports teacher knowledge and instructional use is necessary. Woodhurst (2002) suggests that there is a need for leadership that is determined, open-minded, committed, and has a willingness to take risks. The leadership

must inspire, share a common goal, and be respectful of all parties involved in technology.

Technology support is another serious barrier the literature suggests. The limited support that teachers receive when trying to use technology causes some teachers to avoid using it for enhancing the classroom environment, states Bailey (1997). There are two types of technology support. The first type is technical assistance, which is limited in many elementary schools. Bailey claims that a technician's job is to keep equipment running and anxiety free for teachers. Holland (2001) suggests that teachers receive less technical support than do other professionals. The other professionals have desk computers, whereas teachers may have a computer in their classroom, primarily used by the students. The second type of support is assistance to help with technology integration concerns. Teachers must have access to a knowledgeable technology person for help or some teachers will get frustrated and abandon the technology. Bailey suggests that few teachers are able to integrate technology without support in the form of a technology person who understands teaching concerns, and the technology that is available to help when problems arise.

One other barrier identified in the literature is that teachers and the education system are continuously playing catch up as new technologies have been developing at a quicker rate than the teacher's abilities to incorporate the additions into the curriculum, states Wilson et al. (2003). Schwab and Foa (2001) suggest that aging computers are also a barrier. Classroom management becomes an issue, as there are not enough computers, or they are too old to handle the new technologies. Kleiman (2000) suggests that computers are either located in the lab or in the classroom and either can create barriers.

When computers are in the lab, barriers are created, as there is a limited amount of use resulting from scheduling problems. Computers in the classroom limit the amount of time students can use them, as there are not enough computers for each student to access one, and the teacher requires a shift in classroom management skills.

Uses of technology

Teachers use computers for two functions; the first is to help students learn how to use computers, and the second is to help the teacher with preparing their daily lessons. Wilson et al. (2003) name two uses of computers, instructional and professional. The instructional uses of technology include drill and practice, problem solving, analysing data, graphically presenting materials, researching using a CD-Rom and the Internet, as well as emailing and communicating with experts in many fields. They also suggest some professional uses of technology are communicating with parents and other colleagues, creating instructional materials, giving presentations using multimedia applications, and recording grades.

Three ways of teaching and learning occur when using technology in the classroom according to Bailey (1997): teaching with technology, teaching about technology, and empowering with technology. Teaching with technology allows enhancement of the traditional teaching materials in new and exciting ways that interest the students. Teaching about technology moves it into the field of an individual subject and students study it as a vocational subject in an applied setting. Technology as an empowerment tool allows it to be a student centered process and students become self-directed learners. The three ways of teaching influence how students learn about

technology, and depending on the teacher's method of presenting the material, can influence how students view technology education in the future.

In 1995, O'Neil pinpoints that some teachers use computers to teach students by being involved in international research projects, sending email to scientists, preparing multimedia research papers, and making class projects by videotaping classmates. He also identifies that some teachers use computers to communicate with colleagues on line, retrieve and use resources and lesson plans from CD-ROM databases, and calculate grades while using computer software. O'Neil also understands that these teachers are the exception, not the norm.

Duhaney and Zemel, in 2000, identify the skills used by teachers and students as word processing, spreadsheets, databases, CD-ROMs and DVD's hypertext, hypermedia, multimedia, Internet for resources, email, newsgroups, and listservs. Teachers also use graphics and desktop publishing to create instructional material. They also use test and measurement software. Duhaney and Zemel also discovered that 50% of teachers suggest they are poorly prepared or not prepared to use technology.

Franklin (2003) claims that teachers most frequently use computers for administrative and preparation tasks including record keeping, gathering information for lesson plans, creating instructional materials, and creating multimedia presentations. Two thirds of the teachers use the Internet to access information. The use of the computer is more often for preparation tasks than for classroom instruction. Franklin also states that the computer is used for communication. Elementary teachers use email more often than secondary teachers do. Teachers identify the most commonly used skills as word processing, with 66% of the teachers using the programs, and information acquisition,

with 54% of the teachers using the programs. Only 8% of the teachers use presentation software and student email.

Teacher training

Teachers are at various stages of development in technology and as technology develops, teachers become further behind in the use of it. Two authors, Holland and Kleiman, describe the developmental stages that a teacher experiences when learning the use and integration of technology.

Holland (2001) identifies five developmental levels experienced when learning how to use technology. The five levels are nonreadiness, survival, mastery, impact, and innovation. The stages are developmental and progression is necessary from one stage to the next for every new skill to be effectively learned. The nonreadiness stage includes users that are the most resistant to the use of technology. This stage is technophobic in which the user may feel that the skills are too difficult to learn and will not consider teaching the skills. The survival stage involves users acquiring skills. Users are preoccupied with learning the skills and using the skills themselves, and not ready to teach the skill to others. Teachers at this level have not developed the confidence to identify the uses of technology in education. The mastery stage identifies teachers having the ability to use and understand a particular application, but that does not indicate they are masters of the technology. The teacher is still required to develop the skills to integrate the skills into the classroom learning environment. The impact stage identifies teachers as those who are developing the integration of technology into their teaching. At this stage, some teachers recognize that technology is a tool and not a subject requiring the teaching of skills. The innovation stage identifies teachers as those who are using

technology within a variety of strategies. Those teachers are integrating technology with subject areas, maximizing the potential of the technology, and allowing student learning through discovery thinking.

Kleiman (2000) stated that the researchers of the Apple Classroom of Tomorrow (ACOT) project identified that there are five stages of “instructional evolution” when using technology. The five stages are entry, adoption, adaptation, appropriation, and invention. Teachers at the entry stage are excited and nervous about the technology yet are willing to learn. They are also concerned about the amount of time required. Teachers at the adoption stage begin to use technology in the classroom, although are not changing their current teaching practice. Teachers at the adaptation stage are integrating technology into their traditional classroom practices. They also recognize the benefits to technology and find that students produce more work and are engaged in their learning. Teachers at the appropriation stage use the technology effortlessly in their work and understand it. They also find it challenging to teach when the technology is not available. The teachers at the invention stage are teachers who are ready to experiment with how they teach. They will incorporate interdisciplinary projects and team teach using problem based and collaborative strategies.

Traditionally the teacher training sessions are, as claimed by Jun (2004), one workshop consisting of a few hours with little consideration for the professional needs of the teacher or the teacher’s interests. Teachers are at different levels in their developmental stage, therefore clumping everyone together and expecting them to have all the same skills and learn the same way, do not meet the needs of most teachers. Wilson et al. (2003) claims that there is a need for teacher training and suggests that there

must be release time, and group work at the home school with a hands-on approach. The workshops should also be a minimum of one hour per week for an extended period to develop skills and strategies.

Jun (2004) concludes that computer instructional use in the classroom is minimal because only half of the teachers, who have classroom computers, use them for instruction. Petty (2002) recognizes that over 60% of teachers claim that they are not ready to teach using technology. In order to interest teachers in using technology in the classroom, teachers must be convinced that technology will improve learning suggests Ertmer et al. (1999). They also claim that the need for continuous ongoing dialogue will help teachers develop their abilities and then teachers will be more aware of the potential of technology education. Jun also indicates that technology integration enhances the relationship between technology and student learning. This is too important to leave a teacher to figure out alone, without guidance.

Studies indicate that teacher training is important. Petty (2002) suggests that the requirements should include more continuous training over seven years. This training can provide teachers with confidence, comfort, and experience to effectively integrate technology. Yaghi (1996) concludes that training all teachers to use computers is the most important factor when integrating technology into the curriculum. The focus of training should be on how to integrate the regular educational activities with the technologies. Zhao, Pugh, Sheldon, and Byers (2002) suggest that a requirement for teachers is having the knowledge to use the technologies, as well as the understanding of how it can enhance their own teaching and the students' learning. Zhao et al. also indicate that another requirement for teachers is to work together, as they require support from

each other to successfully create a new learning environment. Petty claims that limited or inadequate training for teachers prevents teachers from discovering the potential of technology. She pinpoints that the lack of knowledge and leadership is the cause of ineffectiveness of the training.

Petty (2002) also states that lack of access and support, as well as time, may keep teachers from feeling comfortable with technology. Time is required when developing skills and learning how to integrate technology in a supportive environment that is risk free and receives continuous long term training. Woodhurst (2002) identifies a need for follow up support, time to practice, receive feedback and evaluation. He also suggests the need for a step by step plan that allows teachers to be aware of the training process, and therefore reduce any anxiety. Zhao et al. (2002) believe that training must be in small steps and that teacher institutions and teacher professional development programs must broaden their views on how to train teachers to effectively integrate technology. Petty indicates that teachers require mentors who are specialists to model and guide them, enabling an understanding of how to effectively integrate technology into their teaching.

How to integrate technology into classroom activities

Integrating technology into the classroom has benefits, and unfortunately, barriers to both teachers and students. In order for the integration of technology into the classrooms, Yaghi (1996) claims that the teachers and administrators expressed a need for a unified computer education curriculum. Bailey (1997) concludes that integration requires an interdisciplinary teamed approach to instruction, as there are positive effects to this. Kleiman (2000) adds that to fully integrate technology and use the technology to its fullest potential the schools and districts must make changes to the current system.

Morrison, Lowther, and DeMeulle (1999) claim that integration can only happen when teachers move beyond being computer literate to becoming technologically competent. In order for teachers to be technologically competent, teachers must experience three factors. The first factor is that teachers must use computers as tools to enhance learning. The second is that teachers must understand the relationship between the basic functions of the computer and students' learning. The last factor requires a shift in teachers instructional practices to a student centered, multidimensional learning approach. The shift requires teachers to use their knowledge of student learning and their understanding of how technology works. Ertmer et al. (1999) claim that technology integration is a distant goal, unless there is an understanding of how teachers use computers and how they can work together. They also cite two studies completed by Sheingold and Hadley in 1993 and Sandholtz, Ringstaff, and Dwyer in 1997 that identifies that as teachers use computers, they rely on their existing teaching styles, but as they gain experience, their approaches to teaching change.

Another study by Dias (2001) identifies the five best practices of teaching technology integration. His study found that effective teachers meet the needs of the students. The teachers use a variety of approaches and strategies throughout the year while they create a balance of activities. The teachers find that their approaches create a community of learners and a supportive classroom environment by encouraging students to take responsibility, make choices, and present their knowledge in a variety of ways. The five best practices that emerged when compiling the data included multidisciplinary and problem based units, the ends drive the means, collaboration and a community of learners, scaffolding for understanding, and using multiple hard and soft technologies.

A multidisciplinary problem based unit includes problems that students may face outside of the classroom environment. The activities require additional time, as they are more in depth; most teachers only plan for one or two of these units each year. The students use a variety of technology tools within a problem based activity unit. One activity Dias (2001) describes is when one class becomes the stockbrokers and work collaboratively with another class who plays the role of investors. The students' use of tools include the Internet, word processing software, and graphing software.

The end product determines the strategies used is another of the best practice methods. A teacher identifies the objectives of the lesson, and then decides whether the use of technology meets the objectives. Then a teacher uses technology in a variety of ways within the activities. The use of technology is to help introduce material, enrich the learning, extend the understanding, provide practice time, provide closure to the lesson or to assess the learning. A single use of technology, or a combination of the uses, is dependent upon the activities and the objectives of the lesson. The teacher uses one of two strategies to present the lesson. One strategy is the direct instruction method, the teacher centered method. The other strategy is the teacher as facilitator method, the student centered method of learning.

Collaboration and a community of learners are another of the best practice methods. The teachers build a community of learners by extending the classroom and encompassing the Internet and email. A teacher may have students collecting data by emailing surveys to other schools on a topic and then compiling the returned data. Other students email friends in different parts of the country and communicate with them while working on a special project. Both the activities extend outside the classroom walls by

working in the global community. Within the activities, students and teachers discover their combined strengths, and by working together, they develop an understanding of a topic.

Scaffolding for understanding is the next of the best practice methods mentions Dias (2001). The teacher provides assistance for the students to learn the concept or complete the task. For example, the teacher may find a number of websites on a specific topic and have students search those sites for information. The next time the students do an Internet search, they may be required to find additional sites themselves. Dias identifies this type of skill building as scaffolding for understanding, as the students develop skills around information retrieval. This may remove the barriers of inadequate search strategies and incorrect spelling. Verbal instructions, written directions, peer tutoring and demonstrations are other forms of assistance.

Using multiple hard and soft technologies are the last of the best practices suggested by Dias (2001). Hard technologies may include digital cameras, flex-cams, scanners, video equipment, or a display device. The display device, claims Dias, is critical when instructing the whole class. The soft technologies are software programs or computer related technologies such as the Internet, word processing, database, email, and multimedia programs. Integration of both soft and hard technologies is necessary when effectively teaching technology.

Full technology integration will cause a change in the role of teachers in the classroom. The traditional role of a teacher's environment is a closed door, isolated environment, while integrating technology opens those doors to the world and requires teachers to communicate and collaborate more with colleagues. Medina et al. (2001)

claims that the traditional role of teaching is so much a part of teachers, that the role change will be difficult for most. Duhaney and Zemel (2000) describes the new role of the teacher as a shift from teacher centered to student centered. The teacher acts as a coach and facilitator using strategies such as guided inquiry, thematic teaching, group problem solving, and critical thinking. For full integration to occur and for the full potential of technology to be realized, a change in the structure of the classroom is required.

With the changes in technology that the education system faces, and the lack of funding to support those changes, teachers will have an uphill struggle to meet the needs of integrating technology into schools and teaching styles. There are benefits as well as barriers to using technology in the classroom. A role change may be required for teachers to fully integrate technology. The literature makes suggestions and the most powerful suggestion is that teachers, district staff, technicians, governments, and other interested parties must formulate a reasonable plan. The district or provincial plan must identify a step by step process of training and implementing technology upgrades. The plan must incorporate the skills that students will require in their future pursuits.

Chapter 3

Research Methodology

This chapter describes the research methodology used in this study. It contains the population and sample, the procedure, the description of the instruments, and the data analysis method.

Population and sample

This research project was conducted in a school district on Vancouver Island enrolling elementary students in 33 schools. Two schools enrol students from kindergarten to grade 3, two schools have students from grade 4 to 7, and the rest of the schools enroll students from kindergarten to grade 7. The school district has families in the high, middle, and low socio economic status ranges, with some schools requiring inner city funding. The district students represent a variety of backgrounds: Asian, First Nations, and European heritages. The teaching population is an aging population with approximately 25% of the continuing contract teachers having 21 or more years of teaching experience, with many teachers retiring each year. The district is one of many in the province of British Columbia that has a decreasing enrolment. In the past few years, teachers have experienced changes to their workload as funding cuts have increased the teacher student ratio.

Two distinct groups of participants took part in the study. The first group of participants consisted of teachers currently teaching students in grades 4 to 7. The second group of participants consisted of lab administrators who currently hold or previously held this position in an elementary school in the district. The role of a lab administrator is to monitor the technology, making sure that the equipment is running, and report

problems to the technicians. Depending on the school and skill level of the lab administrator, they may also put on mini workshops or demonstrate how to use the technology.

There were 205 questionnaires delivered by the district courier to teachers working in the 31 schools having students in grades 4 to 7. Sixty-six teachers returned the questionnaires anonymously. Lab administrators in each school also received the interview volunteer consent form, with six participants volunteering to be interviewees. One participant, who was a previous lab administrator, also emailed the researcher, volunteering to participate in the interview process.

Procedure

The superintendent of the school district received a letter (Appendix A) asking for permission to conduct the research within the district. This letter also included information about the researcher, the topic of the study and information about the participant recruitment procedure for both the questionnaire and the interviews. The researcher received a letter (Appendix B) in response, granting permission to proceed with the research.

This study used a mixed methods design using a primarily qualitative approach with descriptive statistics. Two types of data collection were used for this study: questionnaires from teachers instructing grades 4 to 7, and interviews with lab administrators. In both cases, a package was delivered by the district courier to every grade 4 to 7 teacher in the 31 elementary schools. The package contained a letter of introduction (see Appendices C for teachers and D for lab administrators), a mail out survey questionnaire (see Appendix E) or an interview consent letter (see Appendix F),

and a return envelope. The letter of introduction included information about the researcher, the study's topic, and the consent information. The teachers returned completed questionnaires and lab administrators returned the consent for interview letter through the district courier.

The return of the questionnaires indicated the teachers' willingness to participate in the study. The return of the interview permission letters indicated that the lab administrator was interested in an interview and understood that they could drop out of the study at any time. The interview was voluntary and conducted in person or over the phone with the researcher. The interviewees granted permission for digital recordings to be made of the interviews and received a copy of the transcript to confirm accuracy and correctness of the responses. The letter of introduction included a statement that the interviewee would be identified by a pseudonym, and the researcher would destroy the digital recordings, the individual transcripts, and the questionnaire responses upon the completion of the research study.

Description of instruments

The two types of instruments used for this study were the questionnaire for the teachers and the interview with the lab administrators. The questionnaire was chosen for the teachers because it was easy to administer, get feedback from a larger number of people, and could target all teachers. The interviews with the lab administrators allowed for more probing, more in depth information and targeted those more likely to have a better picture of what was actually happening in the elementary technology program. Most lab administrators would also be interested in technology and would therefore have a different perspective of what was possible when using the technology.

Teacher's questionnaire instrument description.

Questionnaires allow access to more respondents and can encourage a larger number and a greater variety of teachers to respond. For the most part, the questionnaire contained questions to which teachers would give either an affirmative or a negative response. The questionnaire contained three sections: demographics, workshop interests, and the skills taught by teachers.

The first section contained nine questions, which focused on demographics, asking teachers to identify the grade level they were currently teaching, how many years they had taught, their comfort level with computers, and their comfort level teaching computer skills. Another feature of this section reflected on each teacher's previous training, whether or not the teacher was currently teaching computers, and if not, why. The design of the questions allowed the researcher to compare the information in this section with other sections.

The second section was designed to find out the types of technology training workshops that teachers were interested in attending, and the preferred format for delivery of these workshops. This section contained four questions. The researcher also asked the teachers to indicate the order of importance of their technology training needs, such as the teacher's interest level for specific workshops, and the time preference for taking the workshops. The order of importance would help to identify the greatest needs. As well, that information allowed the researcher to make specific recommendations concerning the preferences of the teachers for further training. The last question within this section focused on whether teachers would like to see a stand alone curriculum for the province of British Columbia.

In the last section of the questionnaire which contained four questions, the researcher asked teachers the types of programs they used with the students, the types of strategies chosen to teach the students, as well as, which skills they taught. This information was combined with the demographics from the first section to identify patterns of what teachers are teaching at each grade level. The skills taught were also compared with the comfort level of the teacher when teaching computers. The last question was an open-ended question to allow teachers to comment on any other topic that they felt was important to consider in connection to their use of computers at the elementary level.

The questions included in the questionnaire (see Appendix E) were not test piloted prior to being sent to the teachers. The wording of some questions was a concern as the researcher was unable to fully analyse some because there appeared to be confusion about the intention of the question. The questions within the questionnaire were a representation of the skills outlined in the districts draft scope and sequence. The Information Technology Scope and Sequence for School District 71 (2004) was also consulted to identify points that the research district's draft document did not include. The workshops identified in the questionnaire were a reflection of the skills that were suggested in the two scope and sequence documents as well as the programs most readily available within this district. It was hoped that teachers would be encouraged to use the other category, incorporated within most of the questions, to add topics or skills not included in the questionnaire.

Lab administrators interview instrument description.

The interview process with current and previous lab administrators acquired feedback and opinions from people who work with the technology each day. The questions focused on the lab administrators' opinions about the impact that computers have on students, teachers, and teaching, as well as the barriers that affect the teaching of computer technology. Lab administrators also responded to questions identifying their wishes for the technology program. There were two sections to the interview questions demographics, and the impact potential of computers in the classroom.

The lab administrators' demographic information was the first section of the interview questions. The researcher asked on the interview consent form for the interviewee to identify the amount of time they had been a lab administrator, the number of years they had been teaching, and their comfort level on the computer. The researcher confirmed these answers at interview time and included the grade or grades of the students with whom the lab administrator worked.

The second section of the interview concerned the impact and potential of computers in the classroom. The first of these questions looked at the issue of a province or district curriculum for information technology at the elementary grade level. The researcher asked the lab administrators' opinions about whether there should be a stand-alone curriculum and the reasons underlying those opinions. Other questions looked at the impact that computers have on students, teaching, and the benefits to integrating computers into their classroom. The questions also asked lab administrators to identify the changes they wished to see to the technology program, and the integration of technology into their classroom. As well, they identified areas in which they required

more training. They shared their opinions concerning the barriers to teachers when trying to integrate computers into the classroom. They also identified technology activities in which they were interested, and the barriers associated with them. The last question of the interview was open to allow the lab administrators to address other topics not included in the interview.

Data analysis method

Descriptive statistics were generated from the responses for each of the questions in the teacher questionnaire. These were then used to support a qualitative analysis of the teachers' experiences, needs, understandings, and approaches, with respect to technology in the elementary school. The researcher compiled, sorted, and examined the data from the lab administrator interviews into themes, using their opinions to reflect on the impact of computers on education and teaching.

Chapter 4

Data Analysis

What are the teachers' needs and understandings with respect to educational technology and what are their ideas and practices concerning the teaching of technology at the intermediate level (grades 4 to 7). Data from teacher questionnaires and lab administrators' interviews were analysed to answer this question. This chapter describes the data analysis, which separates the data into sections: Teacher Questionnaire Data Analysis and Lab Administrator Interview Data Analysis. Some questions in the analysis were used to identify possible reasons for the responses. Appendix E contains a complete word by word list of the data for each question on the questionnaire and Appendix F contains a complete word by word list of the data for each question in the interview process.

Teacher Questionnaire Data Analysis

In the district, there are 180 elementary classrooms with students enrolled in grades 4 to 7. The school district employed 205 teachers for the 180 classrooms as some teachers were sharing the teaching responsibilities in the one classroom. The 205 teachers received questionnaires from the researcher asking them to identify what they were teaching in their classrooms. Sixty-six questionnaires were completed and returned, representing a return rate of 32.2%, not ideal, but not unexpected given the length of the survey and its voluntary nature. No mechanisms were used to increase the participation rate. One of the questionnaires was not fully completed and thus the count for some response sets is pared back to 65.

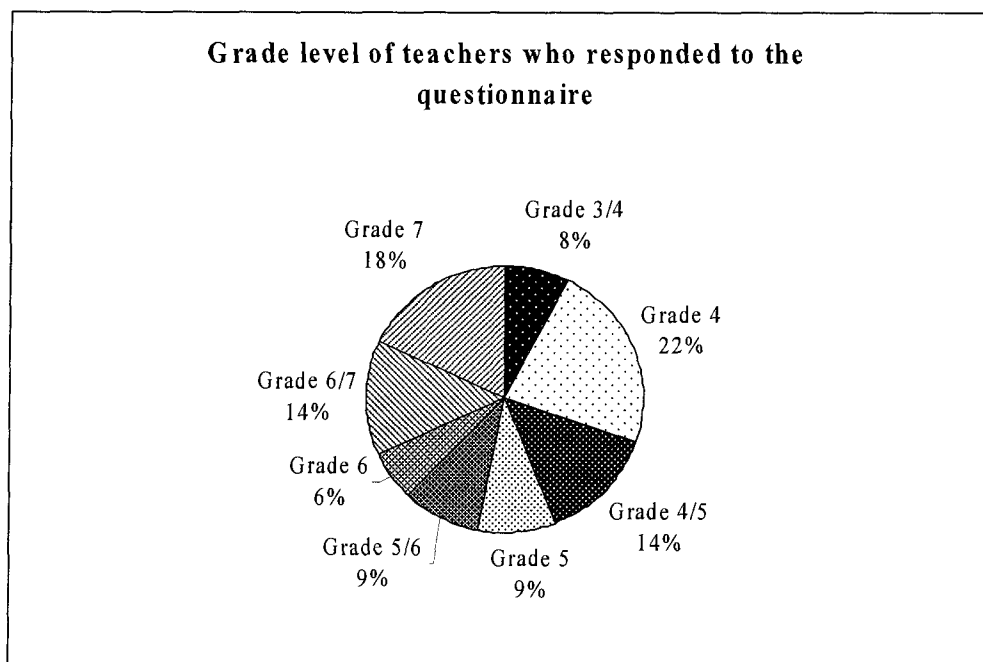
The teacher questionnaire had three sections. The first section focused on demographics; this identified information about the teacher such as the length of teachers' practice, grades taught, access to the draft scope and sequence, comfort level with computers and teaching computers, depth of computer technology training and whether the teacher was teaching computers, and if not, why. The second section asked teachers about workshop participation, interest, and needs. Questions in that section identified whether the teacher was interested in attending workshops, and if so, in what topics or content areas, and the timing of them. This section also included a question about whether the teacher would like to see a stand alone technology grade 4 to 7 curriculum. The last section on the questionnaire identified the programs and skills taught. This section identified the use of the programs and strategies used to deliver the lessons. The teachers also identified the specific skills they taught within each program. The last question identified any additional comments regarding computer use in the elementary schools.

Demographics on the Teachers Who Responded to the Questionnaire

1. What grade do you teach?

Figure 1 shows the grade level distribution of the teachers who responded to the questionnaire. The grade 4 teachers returned the greatest percentage of the questionnaires, while the grade 6 teachers were the least represented.

Figure 1. Grade level of teachers who responded to the questionnaire.



2. Do you have access to the “District Draft Scope and Sequence” for technology document? Yes, No, or Have Never Seen One.

The teachers identified whether they had access to the district draft scope and sequence for technology or if they had never seen one. Forty-four percent of the teachers confirmed that they had access, 12% did not have access, 33% had never seen the draft scope and sequence, and 6.1% of the teachers did not respond. In addition, 4.5% of the teachers claimed that they had access to the draft scope and sequence although they had never seen one. Of the teachers who did not respond, two included a written comment that indicated that they maybe or probably have one somewhere. Another teacher who circled the “never seen one” also circled the word “draft” and put two question marks indicating confusion about the district draft scope and sequence.

3. Are you using the scope and sequence this year to plan your computer program? Yes or No

Eighty-five percent of the 66 teachers did not use the draft scope and sequence, 14% of teachers were using the draft scope and sequence, and 2% gave no response. The percentages do not add to 100% because of round-off error. Two teachers responded with comments that they did not teach computers as they exchanged subjects with another teacher. Another teacher did not use the draft scope and sequence and a comment was included that indicated there was some confusion about the draft being a BC scope and sequence for technology. One teacher indicated “yes” the individual did use the scope and sequence but then stated only sometimes. Three of the teachers who indicated that they did use the scope and sequence had previously indicated that they had either not seen the scope and sequence or did not respond to the question. Thus, it revealed that there was some confusion amongst the teachers about the district’s draft scope and sequence for technology.

4. How long have you been teaching?

The teachers indicated how long they had been teaching. Of the 66 teachers who responded, 44% of teachers had taught 21 or more years, 11% of teachers had taught 16 to 20 years, 23% of teachers had taught 11 to 15 years, 18% of teachers had taught 6-10 years, and 4% of teachers had taught 0 to 5 years.

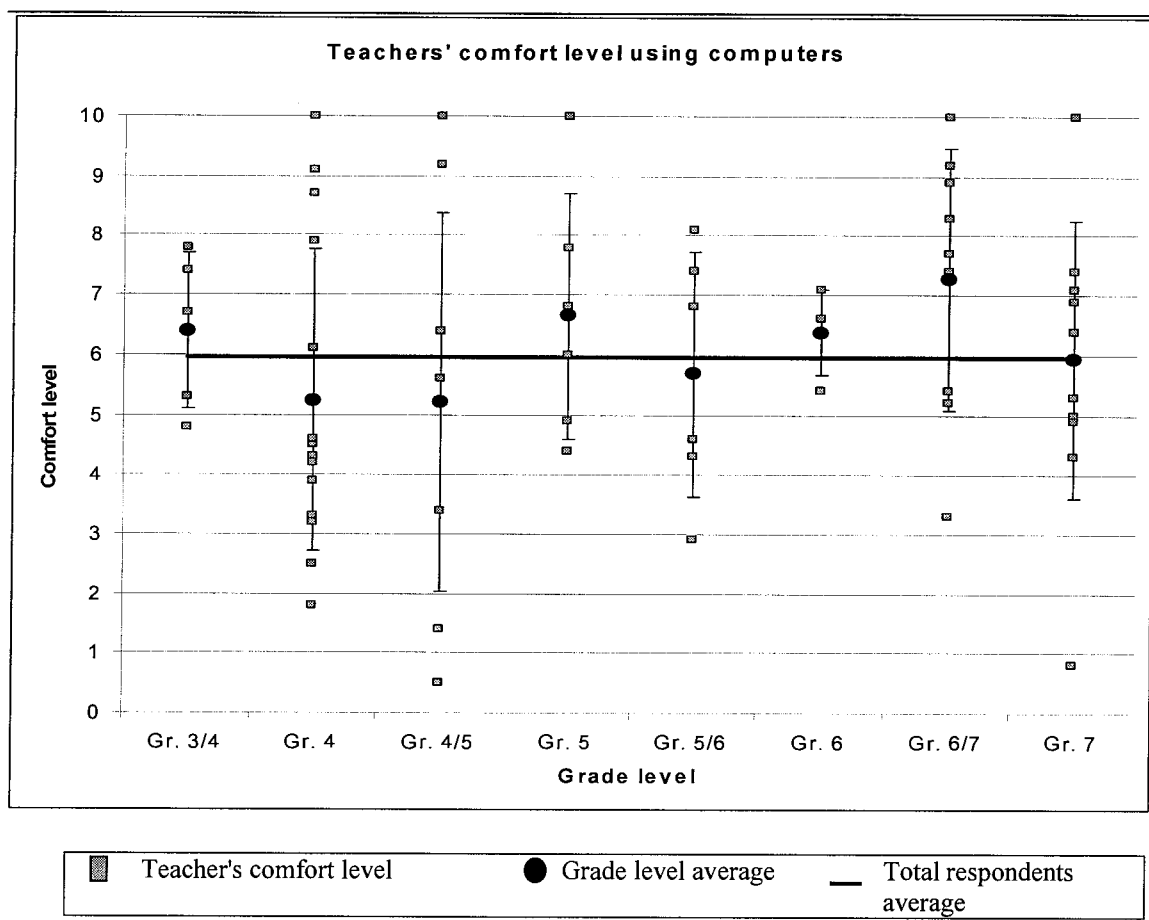
5. What would you say is your comfort level on the computer?

The teachers were asked to identify on a 10 centimetre line where they felt that their comfort level was when using computers. Zero meant the person was not comfortable on computers and ten meant the person was very comfortable. Only 65

teachers responded to this question. The one that did not respond indicated that there was a switch of classes during computer time and therefore did not teach computers.

Figure 2 shows the comfort levels of the teachers when using computers. The graph includes the grade level average as well as the total overall average. Although half of the teachers indicated a comfort level at or above 60% on the presented scale, the distribution of responses was very wide. The graph also includes bars showing one standard deviation about and below the mean for each grade level. Since all the bars are overlapping this shows that there was no significant difference between any particular grade group.

Figure 2. Teachers' comfort level when using computers and the grade level average.



6. *Where is your comfort level in teaching computers at the elementary level?*

The teachers identified, on a 10 point scale, where they felt their comfort level was in teaching computers at the elementary level. Zero meant the person was not comfortable when teaching computers and ten meant the teacher was very comfortable. Sixty-five teachers responded to this question and one who did not respond indicated that there was a switch of classes during computer time.

Figure 3 shows the comfort levels of the teachers when teaching computers. The graph includes the grade level average as well as the total overall average. Slightly more than half of the teachers indicated a comfort level at or above 50% on the presented scale, and the distribution of responses was very wide. The graph also includes bars showing one standard deviation above and below the mean for each grade level. Since all the bars are overlapping, this shows that there was no significant difference between any particular grade group.

Figure 3. Teachers' comfort level when teaching computers and the grade level average.

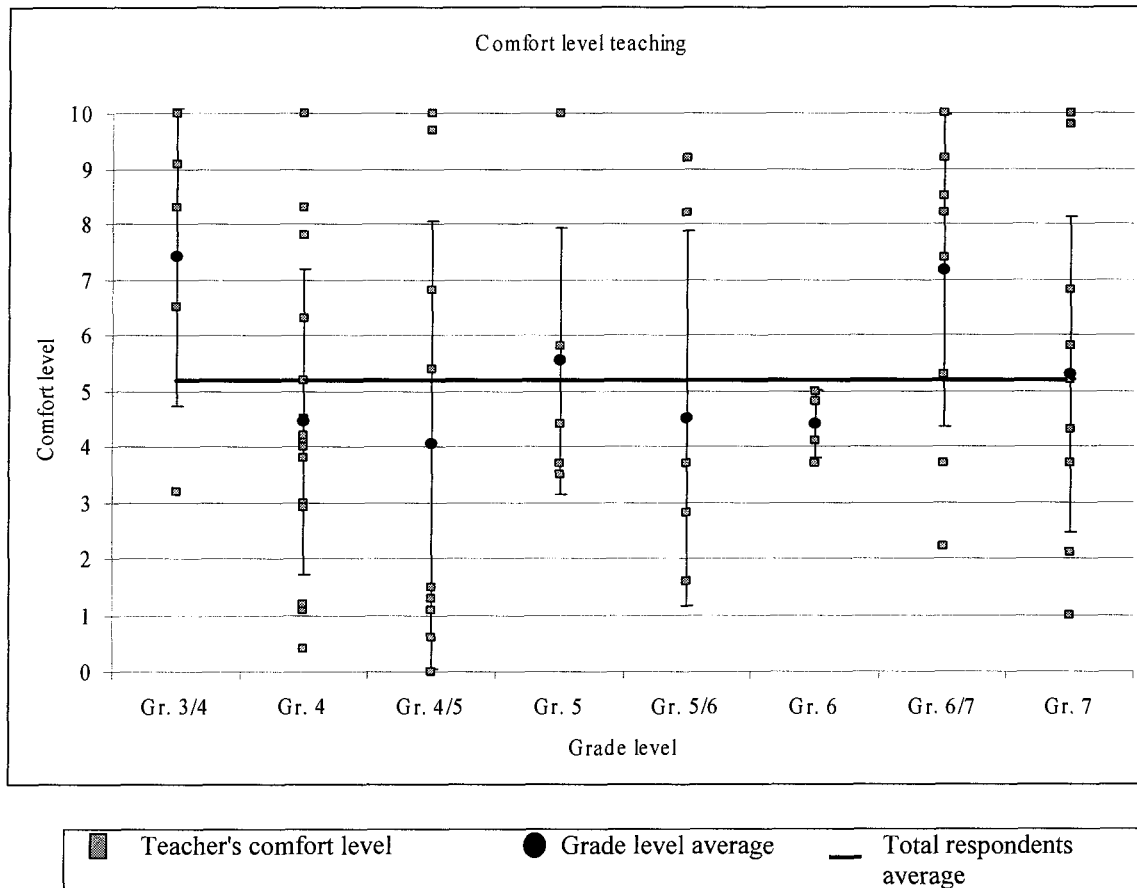
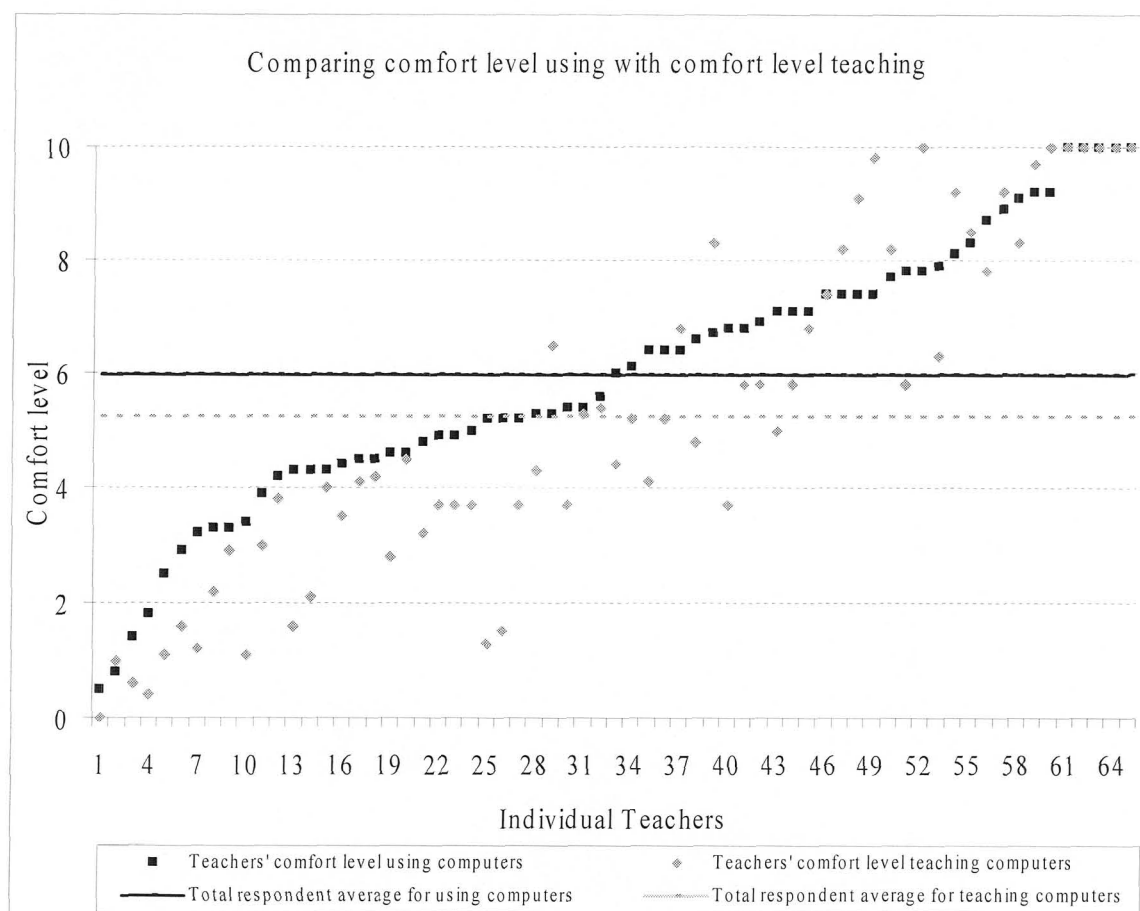


Figure 4 identifies the comfort level of all the responding teachers using and teaching computers. It indicates that overall, teachers were more comfortable using computers than they were teaching computers. The overall average level of comfort when using computers was 6.0 and the overall average teaching comfort level on the computer was 5.2 on the 10 point scale. 30 (46%) teachers indicated that they had a comfort level teaching computers either close to or higher than their comfort level when using computers while thirty-five teachers were less comfortable teaching computers than using computers. The majority of teachers who identified themselves as being more

comfortable teaching computers than using computers were all above the middle range of 5.0 on the 10 point scale.

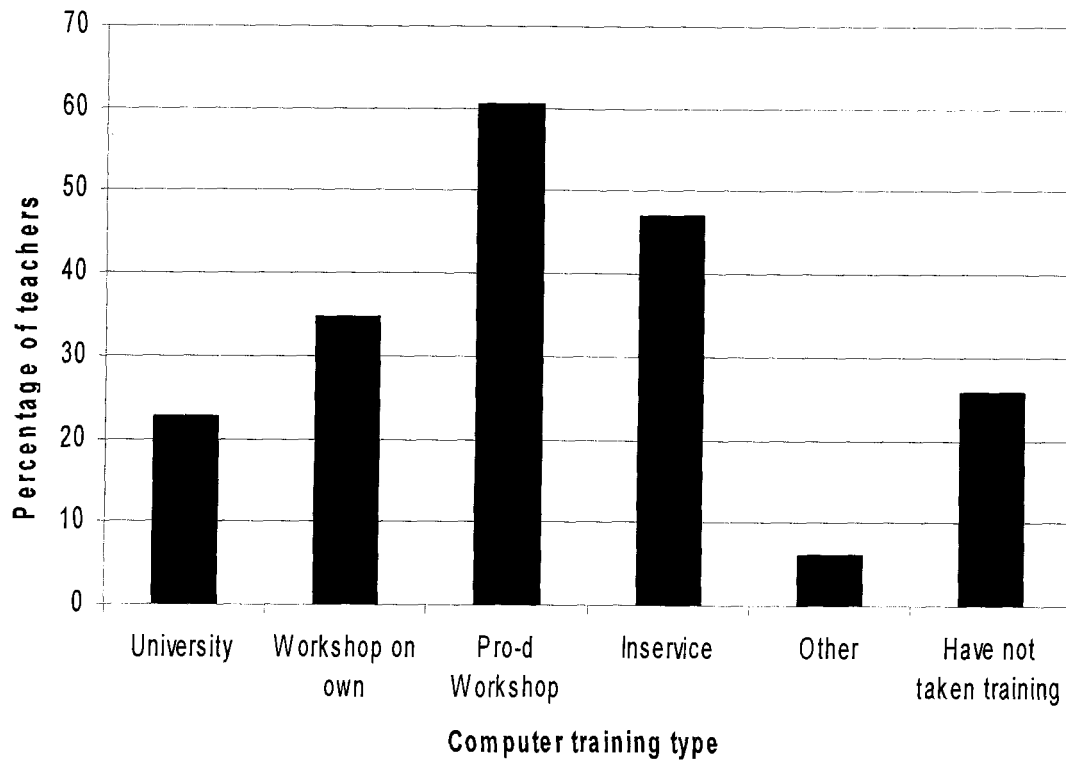
Figure 4: Teachers' comfort level using computers in relation to the teachers' comfort level of teaching computers.



7. Do you have any training in computer technology?

Seventy-one percent of the teachers had some training on computers, 26% had no training, 1.6% did not respond and 1.6% stated that the training was 16 years of personal experience. The most frequently attended workshops occurred on professional development days. Figure 5 shows the percentages of teacher' who have attended each of the computer training types.

Figure 5. Percentage of teachers who attended computer training



The types of university courses that 10 of the 15 teachers indicated they had taken were computer science, IBM network administration, introduction to computers and producing worksheets, building websites using XHTML, PowerPoint, Hyper Studio, and Master's Courses. Twenty-three teachers also indicated that they took workshops out of district. Four teachers responded with the topics of the workshops and those included word processing, graphing, and CUEBC sessions. Others indicated that they had taken and taught numerous courses, but did not indicate the names of the courses. Forty teachers also indicated that they had attended workshops during professional development days. Thirteen teachers responded about the topics of those workshops which included Logo Writer, digital photography, word processing, Publisher, PC Globe,

PowerPoint, Excel, and Internet workshops on accessing websites, using email, web quests, building websites, website pages and scavengers hunts. One teacher's comment was that when workshops were available, by the district technology resource personnel, teachers attended the workshops. The teacher stated that few knowledgeable staff members in the district were available to present workshops. Thirty-one teachers indicated that they attended in-service workshops and nine teachers responded with the topics of those workshops. The in-service workshops that the teachers indicated that they had attended were Kid Pix, SET BC laptop training, web quests, rubric making, network administrator training, PowerPoint, a grading program, and Reader Rabbit. All four teachers who indicated the other category stated what type of training they had. The training included self-taught, 16 years of personal experience, at home use only by trial and error, and friends and own children.

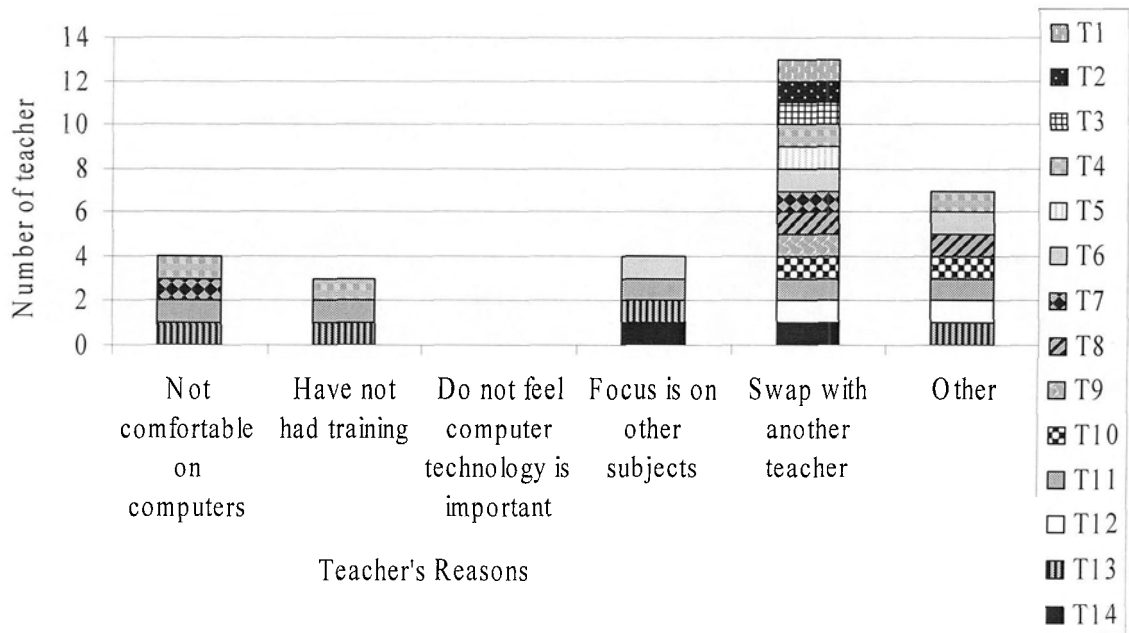
8. Do you teach computers at the grade 4 to 7 levels?

Fifty-two (79%) teachers indicated that they did teach computers at the intermediate grade 4 to 7 level and 14 (21%) of the teachers did not teach computers.

9. Why do you not teach computers?

Of the fourteen teachers, thirteen teachers cited a swap of subjects with another teacher as a reason for not teaching computer. Figure 6 identifies each teacher's reasons for not teaching computers. In the figure, the various patterns represent each teacher and the reason for not teaching computers. As you can see from the graph other than a swap with another teacher, the reason for not teaching varies from teacher to teacher.

Figure 6. Teacher’s reasons for not teaching computers



Note. “T” represents a teacher

Seven teachers also responded to the other category and made additional comments. Five teachers commented that their teaching partners taught computers or they had prep time during computers which was done by the librarian, technology teacher or administration team. One teacher added that the teaching partner taught, computers but that the lab was out of commission frequently. Another commented that there were too many technical problems, which increased the teacher’s stress. The last teacher commented that most of the time there was a swap, although sometimes that did not take place.

Workshop interests of the teachers who responded to the questionnaire

10. Would you like to attend workshops for activities/training on how to integrate computers into your classroom?

The teachers indicated whether they would be interested in technology workshops. Fifty-one (78%) of the teachers were interested in attending workshops. One teacher did not respond to this question. The remaining 14 (22%) of the teachers indicated that they were not interested in taking workshops.

The 14 teachers were isolated and graphed in terms of their teaching years and comfort level on using computers and teaching computers. Appendix G: Table 1 identified information about the teachers not interested in attending workshops: three had taught 11 to 15 years; two, 16 to 20 years; and nine teachers had taught more than 21 years. The teaching comfort levels all varied as four teachers rated themselves as being 8 to 10 in comfort level in teaching computers, while three teachers were in the 4 to 7 comfort range in teaching and using computers. Participated in three or four workshops already was one teacher's reason for not wanting to attend workshops. Seven teachers were in the 0 to 3 range in their comfort level when teaching computers skills. Of the seven teachers, four of them did not teach computers at all.

11. What type of workshops would you like to be a participant in?

Fifty-one (78%) teachers were interested in workshops. The teachers identified the workshops of interest to them by using a ranking system of 1 (most important) to 9 (least important), but still of interest. The workshops most frequently indicated were PowerPoint, web pages and Internet. Other workshops of interest were spreadsheets, drawing and painting, word processing, and database. The workshop with the fewest

interested teachers was email. Four teachers indicated “other”, although only two of the four teachers identified workshops in the other category. One teacher was interested in a web quests workshop, while the other teacher was interested in digital photography and integration across the curriculum workshops.

The teachers identified the workshops in the order of their importance. Eighteen teachers did not identify which were the most important, but simply checked off the ones that they were interested in attending. Therefore, the researcher interpreted the check marks as though the responder had ranked each workshop as first choice. One teacher did comment, stating that all workshops were of high priority, but teachers also needed time to actually use and apply the skills from the workshops so that they remembered the content. One teacher indicated that having already taught these topics to other teachers, there was no need to attend workshops. Table 2 shows the number of teachers who were interested in taking workshops and the rated responses to the specific workshops.

12. Which type of presentation of workshop would best suit you?

Table 3 shows the number of reported preferences for workshop presentation and the rated responses to the specific times for the workshops. Fifty-one (78%) teachers were interested in taking workshops. One teacher indicated the workshops were hard to attend, as they were always full, and some teachers rarely had the opportunity to attend. Eleven teachers did not identify the most preferred times for presenting workshops, but simply checked off the ones of interest. Therefore, the researcher interpreted the check marks as though the responder had ranked each workshop as first choice. Although most

Table 2

Number of responses to each workshop by the number of rated responses

	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Total
PowerPoint	23	4	6	3	3		1			40
Web Pages	20	4	1	4	3	3	2	1		38
Internet	19	7	4	1	1		5	1		38
Spreadsheet	15	4	4	5	1	3	3			35
Word Processing	15	3	2	2	3	4	2	3	1	33
Drawing and Painting	12	2	7	5	1	4	2	1		34
Database	11	1	3	3	8	2		4		32
Email	3	1	1	2	3	3	2	5		20
Other	1						1	2		4

Table 3

Teacher's reported preferences for workshop presentation and the number of responses per choice

	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Total
Professional Development Days	22	12	13	3				50
In-school	29	7	5	4	1			46
In-service	17	16	8	4				45
After school	4	2	7	19	1			33
Evenings	1		1	1	13	3		19
Weekends					2	14	2	18
Other							3	3

teachers preferred to attend workshops on professional development days, more teachers chose in-school workshops as their first choice. The next workshops preferred, in order, were the professional development day workshops, in-service workshops, and then after school workshops.

13. Would you like to see a stand alone technology 4 to 7 curriculum for the province?

Forty-one percent of the teachers indicated “yes” they would like to see a stand-alone curriculum, 32% indicated “no” they would not, 15% were unsure, and 12% of them did not respond, although some responded with a comment. A number of teachers responded by indicating they were unsure, by adding comments such as “don’t understand”, “unsure” or they used a question mark, with one adding a comment that the whole technology curriculum was not of interest. Another teacher thought there was a stand-alone curriculum. One teacher was unsure about what “stand alone” meant, and questioned whether it meant “not integrated”. The last teacher asked if the answer should be “yes!”, then asked “How is this different than what we have now?” One teacher who indicated “no” to a stand-alone curriculum stated there was “not sufficient or adequate equipment to do this!”, and questioned from which subject the time would come. The teachers indicating they would like to see a stand-alone curriculum, also included that more funding was necessary because of the need for systems and software to be standardized. Another stated that a computer teacher was required to teach the technology curriculum.

Appendix G: Figure 7 indicates the “yes”, “no”, unsure and no responses as they relate to the teachers’ comfort levels when teaching and using computers. The figure

indicated that there was not a notable pattern as to teachers' responses. All teachers who responded with a "yes" were above 5.0 on the 10 point scale in their comfort level using computers. The average comfort level varied within each group.

Programs and Skills Taught by the Teachers Who Responded to the Questionnaire

14. What programs have you used or are going to use in your computer classroom this year?

Fifty-five teachers responded to this question although only 52 teachers had previously stated in Question 8 that they taught computers. Data from all 55 teachers was used in the totals since the additional three people did identify skills that they taught. Two of these three teachers had claimed they did not teach computers; the other had stated that their focus was on teaching other subjects while using computers.

Appendix G: Table 4 shows the percentages of teachers using each program per grade level and the overall totals. All teachers indicated they used a word processing program. The second most frequently used application with 98% was the Internet. Typing programs came next with 86%, and instructional games with 66% of the teachers using the programs. Other programs such as drawing and painting programs, PowerPoint, email, spreadsheets, and web building applications were used by less than a third of the teachers. Very few teachers used programs such as ACDSee, and database programs, while Hyper Studio and Robo Lab were not used by any of the teachers.

15. What types of strategies do you use when teaching computers?

Fifty-four teachers responded to this question. Table 5 indicated the top four strategies used when teaching computers: project work, verbal step-by-step method, exploration, and practice. All of the strategies were used by at least 50% of the teachers, although there was no evident pattern through the grades. In the “other” category teachers mentioned, the navigation of web pages, verbal step-by-step using a visual digital projector, and visual step-by-step instructions using Smart Board as other strategies that were used.

16. Fill in all the boxes that apply to what you teach when working on each of the below programs.

General

The most frequently taught skills in the general category were to use current terminology and a program that was previously loaded. Table 6 identifies the general skills taught at each grade level. Overall, 87% of the teachers indicated that they had some of the general skills. Less than half of the teachers had students identify the parts of the computer, turn it on and load a program. One teacher identified “other”, but did not indicate what it was. There was no discernible pattern in the grade levels or the activities.

Touch-typing

Touch-typing was the third most commonly used application by elementary teachers. Four teachers indicated that they taught a typing program, but did not identify the skills. One of the four teachers indicated that the skills were self taught. Another completed the typing skills checklist, although not identifying teaching a typing program. Two other teachers commented that they either did not teach typing skills, or they were a

Table 5

Teaching strategies used by the percentage of teachers per grade level

	Grade 3/4	Grade 4	Grade 4/5	Grade 5	Grade 5/6	Grade 6	Grade 6/7	Grade 7	Overall Total
Total number of teachers who teach at grade level	5	13	6	4	6	4	9	8	55
Total percentage of teachers who responded to the question	100	100	100	100	100	100	89	100	98
Lecture	80	54	17	25	33	25	67	75	51
Verbal Step by step	100	85	100	100	67	50	89	88	85
Written Step by Step	20	46	50	75	83	50	67	75	58
Drill	100	54	50	75	50	75	33	63	58
Practice	100	69	67	100	67	100	44	88	75
Project work	80	77	83	100	100	100	89	100	89
Exploration	100	62	50	100	83	100	67	100	78
Other	0	8	0	25	17	0	11	13	9

Table 6

General skills taught by the percent of the teachers per grade level

	Grade 3/4	Grade 4	Grade 4/5	Grade 5	Grade 5/6	Grade 6	Grade 6/7	Grade 7	Overall Total
Total number of teachers who teach at grade level	5	14	6	4	6	4	9	8	55
Total percentage of teachers who responded to the question	100	93	67	100	83	75	78	88	87
Identify the parts of the computer	80	36	33	25	67	75	33	38	45
Use current terminology	100	93	33	100	67	75	56	75	76
Use a program that has been previously loaded	100	64	67	50	67	50	67	88	71
Turn on a computer and load a program	60	36	17	100	50	50	44	25	44
Other	0	7	0	0	0	0	0	0	2

waste of time. Table 7 identifies the typing skills taught at each grade level. In total, 82% of the teachers taught touch-typing skills with each skill being taught by more than 70% of the total number of teachers who responded to the questionnaire.

Word Processing

Word processing skills were the most frequently taught skills by 98% of the teachers. See Appendix G: Table 8 for a detailed list of the skills taught by teachers at each grade level. The most frequently taught skills were file management and editing skills. The first consisted of open, save and print. The latter included: cut, copy, paste, delete, insert, undo, and redo; spelling and grammar; and, changing font size, style, colour, bold and italics. Fifty percent of the teachers taught students in selecting text, adding and manipulating graphics and editing alignments. The rest of the skills, such as changing margins, finding and replacing, creating tables and columns, were taught, although only by less than 40% of the teachers. The only perceptible pattern was that six teachers taught all 13 skills and had a comfort level when using and teaching computers above the average.

Internet

Internet skills were taught by 93% of the teachers. See Appendix G: Table 9 for a detailed list of what skills were taught by teachers at each grade level. Eighty percent or more taught students to use search engines for keyword searches, to launch a browser accessing the World Wide Web, and to explore information files and search sites. Teachers also frequently taught printing selected material, and copyright and plagiarism issues. Only about 50% of the teachers taught students to observe appropriate etiquette at all times, to copy and paste images and materials to another file source, and to add

Table 7

Touch typing taught by the percent of the teachers per grade level

	Grade 3/4	Grade 4	Grade 4/5	Grade 5	Grade 5/6	Grade 6	Grade 6/7	Grade 7	Overall Total
Total number of teachers who teach at grade level	5	13	6	4	6	4	9	8	55
Total percentage of teachers who responded to the question	100	85	83	75	100	100	44	88	82
Body Position	100	77	83	75	83	75	44	88	76
Hand Position	100	77	83	75	83	100	44	88	78
Identify specific keys	80	77	83	75	100	50	44	88	75
Typing tests for speed	80	69	83	75	100	50	33	88	71
Accuracy Tests	80	77	83	75	83	50	44	88	73

favourites. Skills such as saving search results, participating in collaborative projects, determining appropriate site skills, sending and receiving email and using the Boolean operators to narrow search criteria were taught by less than 40%. There was no detectable pattern to the instruction of the skills by the rest of the teachers.

Drawing and painting programs

Drawing and painting programs were taught by 49% of the teachers. Refer to Appendix G: Table 10 for a detailed list of what skills were taught by teachers at each grade level. The most frequently taught skills were the following: creating freehand drawing; using eraser and other tools in editing, creating, resizing and repositioning images; adding colour by filling shapes or backgrounds; creating circles and boxes; and, changing line colour and width. Other skills frequently used were adding texture to shapes and backgrounds, creating a line drawing, adding text, and importing clipart. A significant majority of the grade 3/4 teachers taught drawing and painting skills although there appeared to be no other predominant pattern.

PowerPoint or multimedia presentation such as Hyper Studio or web pages

PowerPoint or other multimedia presentation applications were taught by merely 27% of the teachers. Possible reasons for the low percentage of teachers using this software are that the software may not be available for the teachers to use, or the teachers may not have developed the skills. Refer to Appendix G: Table 11 for a detailed list of what skills were taught by teachers at each grade level. The most frequently taught skills were to create a presentation or a document, and to create a simple slide show presentation. Teachers who identified themselves as being comfortable using and teaching computers, taught six or more PowerPoint skills. None of the grade 3/4 teachers

taught PowerPoint or other multimedia applications. Just one grade six teacher used PowerPoint, and taught very few skills.

Spreadsheets such as Excel or Works

Spreadsheets were taught by 22% of the teachers. See Appendix G: Table 12 for a detailed list of what skills were taught by teachers at each grade level. The most frequently taught skills were adding data to spreadsheets, recognizing their parts, describing their purpose, and creating spreadsheets. Further skills explored were using spreadsheet terminology, changing column widths, using established spreadsheets to find information, and changing fonts. The data presented no significant grade level patterns for spreadsheet skills, although there were very few or no grade 3/4, 5/6 and 6 teachers investigating them. As well, the higher the grade level, the more skills taught. Lastly, teachers presenting eight or more skills claimed that they were comfortable teaching and using computers.

Database

Two teachers identified skills taught when using a database program. The grade 7 teacher taught all the database skills except moving from form to form. The one grade 3/4 teacher did not indicate teaching database, although identified the using of database terminology, using an established database to retrieve information, and searching and finding skills.

17. Please use the space provided to include any additional comments regarding computer use in the elementary schools.

The teachers had the opportunity to include any additional comments regarding computer use in the elementary schools. The comments fit into a number of distinct

themes: teaching computers, workshops, itinerants, lab time, computer equipment, reliability of computers, and support and funding for computer technology. Appendix E is a complete detailed word by word list of the teachers' comments.

One theme about which teachers commented was teaching computers. Other teachers identified their frustration with using them. One felt that students could use the skills significantly better than the teacher. Another teacher indicated dissatisfaction with teaching computer skills, as the students could learn more quickly at home. The frustration level of teaching computers when there was so much mandated material, was evident in the statement that the teacher felt that computers was the least important subject. Another teacher identified that computers should not be a stand-alone subject by stating that computers should enhance the rest of the curricula. Another teacher indicated frustration by stating that computers are tools for learning, and "telephone" and "television" were not taught, so teachers should be using computers as tools, not a subject.

Problems with the computers were one teacher's reasons for identifying that the potential of the computers was underutilized. Three teachers also identified their displeasure by stating that fewer teachers were actually teaching computers skills, and the few skills being taught were poorly instructed. One of those teachers also noted the decline in computer use had begun when the Information Technology resource teacher's position had been eliminated a few years ago. Another person also stated that all teachers should have accessibility to a school's software so all students had the opportunity to use the resources.

One teacher enjoyed teaching computer skills as the students enjoyed using the computer. Another identified feeling reasonably comfortable with computer use, although was not teaching computers at this time. Lastly, one teacher stated that computer use was good for retrieval of information, as there were not enough adequate texts and library resources.

Workshops were another theme identified by the teachers. One teacher stated a preference for onsite workshops, and that a fellow staff member was going to teach the staff PowerPoint. Another point was that, due to a lack of knowledge, the teacher was not using the computer effectively. Teachers also wanted training with easy to follow lessons. Workshops needed to teach people to learn new programs, so that teachers would use computers as tools.

Another theme identified by the teachers was the need for itinerants. Several teachers identified that there was a need for specialist teachers to teach a proper program, to keep up with technology, and to work with small groups in the classroom. One teacher identified that one school was lucky to have an instructor teach one day per week and work with classes and the classroom teacher. The teacher had learned so much from this team teaching and modelling environment.

A few teachers acknowledged that there was not enough class time in the lab, including a complaint that there was only one session per week in the lab during that teacher's instructional time. Another teacher noted that there was no flexible access to the lab, and therefore the teacher could not utilize the lab during the library teaching time.

The next theme reflected the teachers' frustration with using the computer equipment. Three points made by a number of teachers were with the uselessness of

outdated computers, ill functioning computers, and the shortage of them. These problems caused other difficulties. For example, some students would not complete assignments or even start them. As well, it was difficult making computers an important component. Some classrooms did not even have a computer; larger labs were a “waste of time” and each classroom required mini labs of four to six computers. Another concern was that computers could not run certain programs, as they were underpowered, or that the programs were not available in all schools.

Along with teachers’ frustrations with the number of available computers, concerns about computer reliability also arose. There were common complaints such as computers in the schools were a “nightmare”, equipment was “often broken and archaic”, and 50% of the time the lab was not working so “what [was] the point?” Another teacher stated that due to technical difficulties, the computers were frustrating to the point of being a “big waste of time”. One stated that over half of the class could not log in on a regular basis due to problems with the computers. A third did not know what to do with students who did not have a computer because the computers were not all working at the same time and the lab was too small to have partners. Finally, one teacher concluded that the wait time to get the technician into the school was “ridiculous”.

The final theme involved teachers’ frustration and irritation with the lack of support and funding for technology programs. One complaint was that budget cuts had diminished the teacher’s ability to deliver a coherent technology program. Other teachers stated that proper funding was also required if a curriculum was to be established. A third teacher stated the technology scope and sequence was a “farce” and was “just another add-on without money or support”. A fourth teacher stated “the province and district

were totally irresponsible and non-supportive. Most labs [were] a waste of money because of the lack of support and training.” The last teacher stated that every school must have a computer expert to solve problems immediately as they occur.

Lab Administrator Interview Data Analysis

Thirty-one elementary schools within the district enroll students in grade 4 to 7, and all have a lab administrator. Each of the thirty-one lab administrators received a letter asking for interview volunteers. Seven current or previous lab administrators were interviewed.

The interviewees questions were divided into two sections. The first section was demographics, which included questions about how long the interviewee had been a lab administrator and a teacher. The grade levels of the students and the comfort level on the computer were two other questions in this section. The second section identified the impact and potentials of computers in the classroom, including the lab administrators’ opinions about a stand-alone curriculum for the province or district, and the impact that computers had on their teaching and on students. As well, they gave opinions of the benefits of computer integration, identified the changes needed with the technology program, acknowledged strategies used to integrate computers into their teaching, and aspired to learn more about computers. The lab administrators also gave their opinions concerning the barriers to using computers in their teaching, as well as the activities they would like to do but could not, and why they could not do them. The last question asked the lab administrators to identify anything else that they would like to add.

A pseudonym identified each participant in the interview process: Adair, Reese, Dakota, Baden, Tait, Harper, and Maitland. Appendix F lists all of the comments made by the lab administrators.

Demographics

1. How long have you been a lab administrator?

Reese, Dakota, Maitland, and Tait had held the position for 10 or more years and Harper, Adair, and Baden were in the position for 2 to 3 years.

2. How long have you been teaching?

Reese, Dakota, Maitland, Tait, and Harper had taught for 21 or more years, Baden for 16 to 20 years, and Adair for 6 to 10 years.

3. What would you say is your comfort level on a computer?

The lab administrators' comfort levels ranged from 5 to 10 on a 10 point scale. Lab administrators Reese, Dakota, and Maitland were very comfortable and had 10 or more years of experience as the lab administrator; also, they all had 21 or more years teaching experience. On the 10 point scale for computer comfort when using computers, Tait indicated a 6.9, and had 10 or more years of experience as a lab administrator, and Harper indicated 6.8, with 2 to 3 years experience. Lab administrators, Adair and Baden, indicated 2 to 3 years of experience as lab administrators. Adair indicated 6.3 on the 10 point comfort scale and had 6 to 10 years teaching experience, and Baden indicated a 5.4 on the 10 point comfort scale and with 16 to 20 years of teaching experience.

4. What are the grade levels of the students you work with?

The lab administrators identified the grade levels of the students with whom they worked. Tait, Harper, and Baden worked with students in grades 4 to 7, Reese, grades 4

to 6, Maitland grades 4 and 5, Dakota with students in grade 5, and Adair with grade 6 and 7.

Impact and Potential of computers in the classroom

5. *Do you feel that there should be a stand-alone curriculum established for technology at the elementary grade levels? Yes or No. If yes, should the curriculum be province wide or district wide? Explain.*

Lab administrators, Reese, Tait, Adair, and Harper, stated that there should be a stand-alone technology curriculum established at the elementary level. They also believed that the curriculum should be province wide, with conditions. Reese identified that a base level of literacy among teachers would be required, and if the curriculum were province wide, then teachers would develop the base level skills as well. Tait declared that a clear direction and better support were required from the provincial government and a curriculum was the only way to standardize the program as well as pointing out the need for fine tuning of the standards and expectations at the district level. Harper believed that there should be a minimum set of expectations mandated, with teachers support for each grade level with a gradual age appropriate increase. Harper also explained that teachers needed a minimum standard of technology literacy with a specialist in every school. Adair indicated there should be a specific curriculum, but as software and hardware were not available for all schools, a standard would need to be set. As well, the district would require a technology advisor or director, as the technology programs would need to be running properly to be effective.

Baden commented with both a “yes” and “no”, while Dakota and Maitland declared that there should not be a stand-alone curriculum. Baden pointed out that it

would be a good idea, but technology did not stand alone. Integration of technology into all subjects was important as technology skills had to mean something and be relevant to the students. Baden agreed with the above lab administrators that goals and objectives had to be consistent because students moved from one district to another in this province. In order to meet those goals and objectives, teachers would have to integrate computer skills into other subjects, not teach them in isolation. Dakota expressed that integrating technology into the existing subject curriculum should occur, while also indicating that there was a need for a matrix of skills as a guideline for teachers to follow and to teach skills in context with other subjects. Maitland stated that having a stand-alone curriculum would be adding one more subject to already overworked teachers and overloaded curricula. Maitland also agreed that computers were not the curriculum; computers were tools to help deliver the curriculum. The problems associated with a stand alone curriculum were that some software was not available at all schools and there were no set standards for computers as each school had a variety of computer hardware. There were not enough technicians available to repair computers so they were down for up to six months. Another problem was that the teachers had different levels of comfort, experience, and demands on their time. Teachers may not have had the skills and there were no training courses, guidance, or support for teachers developing those skills. Maitland also concluded that with no guidance from the ministry, the district or anywhere else, a stand-alone curriculum would never work. In order for a stand-alone curriculum to work, there must be standards set. The standards would require teachers to have a base level of computer literacy and all schools to have the same minimal set of standards for technology. Maitland also added that the teachers who could teach technology skills

would, and those that could not teach technology, would not. Another problem with establishing a technology curriculum was that the ministry would assign people to get together to develop the curriculum. Maitland explained that a number of people would get together, include too much information and argue over the content. Some content would be discarded, but not enough, and then the curriculum would arrive on a teacher's desk with too many mandated requirements. Maitland also added that there were already too many learning outcomes in the current Information Technology Resource Document and that there must also be a focus on higher level learning, not on basic skills such as keyboarding.

6. *What impact have computers had on your teaching?*

A number of themes emerged as to the impact of computers: materials, projects, assessment, communication, teaching styles, and problems. The first theme that emerged was materials, resources, and lessons on the Internet. Reese stated the web had rich teaching materials such as resources, current information, and interesting lessons and this was very helpful as there had been a teaching level change. Harper, Maitland, Baden, and Adair also acknowledged that access to the Internet had a huge impact on their teaching. Harper identified the Internet as a good source of research, but not always a reliable one. Also noted was that due to library funding cuts, librarians were turning to computers as a resource. Maitland explained that students could research topics and then make displays with the information. Baden added that research using the Internet would occur before presenting a topic to the class. Adair concluded that accessing current information was better than reading 10 to 20 year old texts.

The second theme that emerged was computer based project activities. Word processing, drill, practice, typing, and games were the only activities that some teachers were using, stated Maitland. Dakota and Baden used web based projects, such as web quests, as there was a lack of text based resources. Dakota also used PowerPoint or web pages instead of paper and pencil projects. With an online web catalogue, projects using both books and computers were easier to research. Along with the activities, teachers require access to the computers to do the projects, and Dakota pointed out that it was important to provide extra time for teachers to access the computer lab each week. Each week, classes had two periods scheduled. The timetable also allowed for a one hour open block each day for teachers to use when students were doing special projects.

Assessment was another theme that emerged. Reese and Maitland both declared that the computer made record keeping easier. Maitland identified that marks and homework checks recorded in Excel immediately were quicker than recording using paper and pencil. Maitland also added that if the computer was down, it took extra time and work to record marks on paper. Reese explained electronic assessment was easy and made writing report cards easier. As well, with access to a palm pilot, on the spot assessment could be quick and easier, allowing downloading of the information to a laptop for easy record keeping.

Communication with colleagues, parents, and students was another theme. Maitland emailed parents and students, permissions slips, homework assignments, and notes. Harper declared emphatically that it was “criminal” for a teacher not to use, or refuse to use, email. Accessing email is the minimum skill a teacher should have as teachers can communicate with colleagues within and outside the school. It also saves

paper and time. Harper pointed out that email increased knowledge because a teacher had access to listservs that promoted educational development. Listservs opened eyes to the educational issues so that a teacher could find out what was going on around the world. Reese added that communication with colleagues all over the world was possible with technology. A teacher could connect with others who had similar interests, collaborate on school projects, and have students use it for email pals and country exchanges.

Teaching styles was another theme identified. Baden pointed out, "You cannot ignore computers. They have to be taken into account and [teachers] almost do not have a choice anymore. They have to be used." Some teaching styles would not incorporate technology. As Harper stated, "Some teachers have been teaching a certain way for many years, and computers have not been a part of their teaching before and will not be a part of it now". Computers have had an "enormous impact on the way I teach and think about teaching", described Maitland. It was difficult to teach without a computer as an instructional tool. The computer made teaching easier, faster, better, and developed higher level thinking skills. Harper identified that digital projectors had also had an impact on teaching. Maitland noted that technology saved paper, time, and transparencies.

Another theme was the problems that technology created. Baden explained that the students required other skills such as how to search, evaluate sites, and cite sources, as well as knowledge about plagiarism, copyright and ethical use of information. Tait pointed out that computers were frustrating because they were often down and it was difficult to rely on them as regular support was unavailable in the schools. Computers were not being used to their potential because of frustrating factors. Adair also had

concerns about the failure of the technology to work. Harper concluded that mentally, it was tiring using technology, as it changed so fast, teachers must keep adapting.

7. What impact has the computer had on the students?

Four themes emerged that demonstrated the impact: authentic learning, skills of the students, potential for students depending on teacher skills, and other problems.

In the first theme, authentic learning, Dakota concluded that computers impact everyone's lives. Tait and Reese pointed out that intermediate students have grown up with technology in their homes; therefore, technology in the schools made for authentic learning. Technology in the classroom allowed students to practice the way they learn at home, as students could draft work on the computer, check spelling, and edit. Baden acknowledged that students were more natural and confident around technology than teachers because technology had been part of their childhood.

The second theme that emerged was the skills of the students. Dakota recognized that even though students were comfortable with computers, they were not literate. Students had not learned how computers could empower their learning, although they could turn it on, and use email, Internet for online games, chat rooms, and music downloads. Harper pointed out that students loved computers, while Dakota acknowledged that students who usually did not complete assignments, do the work when on the computer. Tait stated, "I think kids are having good exposure to computers in terms of word processing skills". Baden indicated that students trusted and relied on the Internet and still required the skills to discriminate between what was relevant and how to filter the information. Harper added that "some students thought that they could Google their way to academic excellence". Dakota acknowledged that technology had a major

impact on the students' lives. Education and teachers have a major role in teaching students to use technology as a productive tool. The students must develop the proper skills such as Internet searches or even file management, and not just play games. Then they might see the uses of the technology as a productive tool.

The third theme was the potential for students having to depend on the teacher's skills, no matter the level. Harper and Maitland stated that the potential was huge, but it depended on the teacher. Harper concluded that due to lack of training and knowledge, there was a huge discrepancy among teachers' skill levels. Maitland recognized that some students knew more than the teacher, and were not getting the benefits because they were playing games instead of developing higher level learning skills. Maitland pointed out that computers were not valued, but were invaluable, and added that the impact was negligible and a waste of money because technology was not supported. Reese stated that if the technology was used correctly, it could be used to differentiate the curriculum and allow students to work independently and progress at their own rates, which would allow enrichment for all students.

The problems that occurred with students when using technology was also a theme. The students were not afraid of computers and they would modify settings. They would also play games instead of remaining on appropriate sites. Consequently, the students must be monitored more closely, as the computer should be used for educational reasons, not recreation, declared Harper. Another problem was that there were excellent educational database resources available, but students were unable to access the resources due to a lack of funding. Adair added that students had access to relevant and current information, when the computers were running. A good and bad implication was that

technology had made the world a smaller place. Other concerns and problems, as described by Adair, were that the use of MSN, during out of school times, created an increase in inappropriate behaviour such as bullying and gossiping, which affected the classroom. The other factors were the way students communicated when using MSN or email as that affected the way they wrote, shortening words such as laugh out loud to “lol” and you to “u”.

8. *What are the benefits of integrating computers with your program?*

The lab administrators were asked to identify the benefits of integrating computers into their programs. The themes were differentiating the curriculum, resources, motivation, computer use, and problems.

Computers, suggested Reese, allowed teachers the ability to differentiate the curriculum to meet the needs of all students. Reese also concluded that integration also allowed for “opportunities of self direction and independence in [student] learning, as well as taking the stress off the teacher as learning became more authentic”. Tait described that computers allowed for individualized practice for students on a specific area such as math skills. Adair pointed out that technology freed up time for the teacher and educational assistants, as reading programs can scan and read the material to students allowing the student more independence. Technology offered other students the opportunity to work at their own pace, making the work easier as some students found it easier to type than handwrite their own work.

Resources were another benefit to having technology in the schools. With a lack of funding to purchase up to date materials regularly, the Internet allowed teachers the opportunity to provide students with current information. Reese, Dakota, and Harper all

described the opportunities to use resources from the web. Reese added the Internet allowed access to current geographical and cultural information, as well as support materials, such as dissections and the microscopic world. Dakota explained that the students were able to use web based resources, with Harper summarizing that the resources had to be relevant, recent, and up to date.

Motivation was another benefit for integrating technology into the curriculum. Both Dakota and Maitland identified that computer technology was a motivational tool for students. Baden pointed out that computers were an important part of our lives and they were everywhere.

Another theme was the use of computers. Baden stated that computer use came with practice. The more involved that teachers became with computers, the more they used them. Baden and Harper both identified that computers were a tool for education. Baden added that computers were not just entertainment, and Harper elaborated that computers was one method for enhanced education. Maitland stated that teachers could teach topics at a higher level and faster than before, and that integration was the key. Maitland integrated computer skills into the students' activities, and therefore spent very little time teaching computers. Dakota and Harper clarified that students were online with others all over the world, while Dakota included that teachers were collaborating with colleagues as well. Other skills, such as word processing and typing programs, stated Adair, were making projects that encompassed a broader range of skills. Harper acknowledged that greater access to knowledge improved students' abilities.

Problems, that tend to hinder the use of computer technology, were another theme. Time, as indicated by Tait, was a concern. The time to learn a program and

become comfortable with it was not always available. Tait also stated that methods for integrating computers into the classroom was a concern, as there were programs available for use, but teachers were not sure how to use them. Harper explained that the current educational system had to be adapted to use the computer. The stress levels of teachers were already high because of class compositions and individualized programs. The thought of learning how to integrate was of no interest to some teachers, as they had taught successfully for years without computers, so they did not need to change now.

9. What would you like to see happen with the technology program?

Although the lab administrators identified what they would like to see happen with the technology program, the initial response by Harper was to say “what technology program?” The lab administrators identified a number of themes when responding to this question including, the value of technology, resource persons, integrated learning outcomes, suggestions, and problems.

The first theme was the value of technology. Both Reese and Maitland identified that they would like the district to value technology in the classroom. Maitland also added that a technology program should be supported, and technicians, computer equipment, and software provided and valued.

The second theme was the need for a resource person and leadership. Dakota acknowledged a need for a district resource person, as the use of technology had dropped off since the resource position had been eliminated. There was also a need for school based technology leaders. Adair indicated that training and release time were important for a teacher to develop technology skills, as professional development days were not enough. Adair also stated a need for more teacher accessibility to computers, such as a

place for a teacher to work outside of the lab, and get support within the school. Adair and Reese both identified a need for a technology program change. Adair added that there was a need for a total revamp of the system, but that the development must come from the perspective of the teachers who work within the system, and not a person trying to think as a teacher. Reese declared, an educator driven program was required, and the decisions based around an educational focus, rather than the current technical focus. Reese also stated, at the current time, the rules hinder what a teacher could and could not do, and added that the important part of technology was not the administration of the system, but what the students required when using it. Reese also identified that “the security and help of the network was important, but not as important as the education of the students”; risk taking was required so that education could meet the needs of the students. Harper recognized that collaboration between a technology person and the classroom teachers must occur, while Tait and Adair both indicated the need for more access to a technician. Tait declared an important requirement was that there be a set amount of time, each week or two, for the technician to be available at every school site to consult with the lab administrator. Tait also recognized the need for the technician to have freedom to go where needed.

The integrated learning outcomes was the next theme. Dakota pointed out that a requirement was a set of learning outcomes that integrated the technology into the current curricula. Baden added that because there was no consistency from one class to the next, there was a need for a concrete set of guidelines that must state the expectations. The outcomes or guidelines should identify the goals, the exact expectation, and the criteria for integrating technology into the classrooms. With technology changing so fast, Baden

explained, problems occurred when setting goals and objectives, as they might not be relevant six months later. Harper concluded that completion of the draft scope and sequence was important, and identified two parts of a technology program. The first part of the technology program was the ministry or district guidelines for technology. These organizations should mandate how many students per computer, how much money to maintain the computers, and the level of access to software and databases. The second part was the “point of use”, by the user, and a scope and sequence identifying the skills. The “point of use” would require a qualified technology person, who was the classroom teacher or technology specialist who worked with the classroom teacher as a trainer, delivering the scope and sequence.

The suggestions involved funding and computer labs. Dakota identified that there was a need for more money for technology. Maitland added that funding for a technology program be divided into thirds, with 1/3 software, 1/3 hardware, and 1/3 training. Adair made two suggestions that included dismantling labs and putting five to six computers in each classroom, as well as, having labs that were wireless and could be moved from classroom to classroom on a sign out basis.

10. How do you integrate computers within your classroom?

Reese stated that computers were a part of the classroom like the desks, chairs, boards, and textbooks. The students know that during a class discussion, if they need information, they can get up and go to a computer to find the information, then return to the discussion with information that they could contribute. The computers were a resource to find information, a tool for learning, and a source of entertainment.

Other ways of integrating computers in the classroom were project based activities, Internet use, word processing, educational games and activities, video projector use and skills. Dakota integrated them using technology based projects such as web based science and social studies units, and Internet access. Baden integrated computers by using web quests and research skills by comparing information from book sources with Internet sources. Baden's students also created web pages, completed word processing projects, and primary classes used educational games. Maitland integrated computer technology by creating language arts activities, PowerPoint, and believed that a video projector was essential for every classroom. A video projector could present teachable information on a screen for all of the students to see. A quick Internet search could produce visual information during a discussion. Adair integrated technology by doing Internet research, novel studies, web quests, PowerPoint, and typing activities, when the computers were working. Harper integrated technology by teaching students to use Web Cat (online library catalogue), Internet, word processing skills such as cutting, pasting, printing, importing pictures, using charts and graphs, and touch typing programs. Harper also felt that teachers required a mandated set of goals. Technology should be a part of the curriculum and not just integrated on the whim of the teacher. Tait integrated computers by using skills practice, word processing, and story writing, but wants the ability to use the computer for individualized learning. Tait also stated that a minimum of one computer was necessary in each class, one for every student in the lab, and four in the learning assistance room. All computers should have access to a server, although not all computers required the same licenses, as some computers would only require individual licenses for specific programs.

11. How would you like to learn more about computers? If workshops, what workshops would you like to attend and what would you like to see in them?

The lab administrators' responses were separated into themes such as, workshop topics, support for teachers, and workshop time preferences.

The vision of the classroom or future classroom, and the best use of technology in the classroom, were Reese's topics. Harper's was with an "educational focus", and Baden was interested in the whole concept of integrating technology into the classroom. Reese also indicated that it was important to communicate with colleagues, as teachers had lost this valuable tool. Dakota stated networking was also important and that becoming a member of an organization, such as Computer Using Educators of British Columbia (CUEBC) or a local association, allowed people in education to discuss computer education issues.

Lab administrators identified the workshops they were interested in attending. Adair's choices involved animation, web quests, web pages, and integration of science. Harper's interests were creating and maintaining web pages, PowerPoint, Excel, word processing, Kid Pix, and pen pals. Baden's were digital imaging, PowerPoint, and web site building. Maitland wanted workshops concerning PowerPoint, email, Excel, Word, and Internet searches. Dakota stated that two types of workshops were important: how to use an application and on how to integrate technology when using the application. Baden believed that there was a need for workshops to help increase teachers' skills and confidence in computer use. Each teacher should have workshops addressing individual needs, expressed Harper. This "point of need" referred to the usefulness of the workshop and the immediate practice of the skills and information taught in the workshop.

Adair recognized that teachers required a Director of Technology. Both Adair and Maitland indicated that there was a need for a qualified person to model technology integration for classroom teachers. This person would be a presence in the class helping increase a teacher's skill in developing computer integration, as well as learn to troubleshoot in a practical real life setting. Maitland also added multi-level workshops were beneficial. A multi-level workshop would include a skills workshop, a follow up session designed around troubleshooting, and a brush up session. Harper suggested packaged workshops would also benefit teachers. A package workshop would include ready to use activities with specific instructions, directions, and suggestions, such as a form fitting project that fitted specifically with a topic, grade, and subject. The teachers required basic support initiated at the district level. A hook to get teachers interested was the email, and a push to increase the use of email would help teachers on a personal level to see the value of technology. The added confidence of teachers at a personal level would create teacher motivation to want to explore more of the technology.

The suggested times for the workshops were professional development days and release time in school. Baden explained that both professional development days and release time were important because in after school workshops it was hard to assimilate the information, as teachers were tired. Dakota and Adair both added during the school day was the best time for workshops. Tait indicated that attending workshops was important, although the practical time was also important. The practical time would allow teachers to learn the program from a personal perspective. Tait suggested that the software be available to take home for a few months to practice and explore the options.

Presenting workshops on specific programs also gave the instructor a deeper understanding of the program.

12. Are there any barriers for teachers as to using computers in the school? What are they?

Lab administrators identified their opinions of what the barriers were for teachers when using computers in the school. The common themes were teachers' literacy level, support for teachers, technical support, access to computers, and funding.

Teachers' computer literacy was one barrier that the lab administrators identified. Reese stated that teachers were not comfortable with technology and therefore were reluctant to teach it. Reese indicated that a buddy system or team teaching were ways to avoid teaching computers. Dakota, Harper, and Adair all concluded that a fear of technology was due to the aging workforce. The aging workforce had not grown up around computers and therefore computer skills were not natural for some teachers. Dakota felt that some teachers were becoming more comfortable, although they were still not where they needed to be. Harper explained that some teachers have computer "technophobia". Those teachers thought that technology had passed them by, as they saw other teachers doing activities impossible for them, as they lacked the knowledge about how to use technology. Those teachers actually must attempt to integrate activities into their classroom, and they would realize that other teachers were just learning, as well. Adair intimated that some of the older generation of teachers were not comfortable using computers, and not willing to learn. Tait stated that experience and willingness on the teachers' part to integrate computers into their classrooms were concerns. Baden concluded that a barrier was the teacher's own lack of confidence when using technology.

Baden indicated that the use of emails through the school was one skill that teachers could use to become less reluctant and more comfortable with computers. Maitland identified the teachers' lack of interest and knowledge of how to integrate computers. Harper also added that a lack of time and training, and teachers being uncomfortable about their level of knowledge in comparison to some of the advanced students' knowledge, were reasons teachers gave for not using technology. Many teachers looked at computers as an add-on, not as a tool for integration, pointed out Maitland. These teachers would say that there was not enough time that day for computers, and skip it, whereas Maitland would wonder how to get the language arts activities done without the computer.

All lab administrators indicated that the lack of support for teachers was a barrier. Adair also added that there were no provincial guidelines, and not enough resources. Dakota explained there was a need for more access to workshops and more release time. Also suggested was that a group of expert or master teachers in technology go to schools for a day or two and instruct teachers on better computer utilization. Reese recognized that the support required must be more than just fixing a computer; the teachers required support when unsure about how to use technology or the most effective way to use it in the classroom. Baden, Harper, and Maitland all stated that teachers required training. Skills would then require immediate practice, then more training and more practice. Harper indicated that too much information at once was overwhelming, and if not used immediately, the knowledge and skills would be lost. Baden also indicated that the technical aspect of the lab administrator position was a barrier, but the technology expertise was increasing.

Access to technology was a barrier for teachers stated Reese and Harper.

According to Harper, not every teacher had access to an online working computer in the classroom, a necessary and convenient tool. Ideally a computer should be on every teacher's desk, then it would be more difficult for a teacher to use the excuse that it was not convenient. Tait explained that access to adequate and reasonably priced software was also creating barriers for teachers.

Tait and Reese both indicated that access to technical support was important. Tait concluded the inconsistent support in getting computers fixed was a concern. Reese clarified that when a teacher started to rely on the technology, with constant breakdowns, and taking long periods of time to fix, then a teacher would stop using the technology.

Funding was another barrier for teachers. Dakota declared that the biggest barrier was funding and resources. Maitland also identified money as a barrier. Harper added training should receive 30% of the technology money. Adair acknowledged that not enough money was available for running computers, or buying software, printers, and other technology.

13. Are there activities that you would like to do but cannot? Why?

Reese indicated that because of a high comfort level and strong technical knowledge, there were no problems for which a solution could not be found. The other lab administrators suggested activities that they would like to be able to do, indicating why they were unable to do the activities and suggested some solutions for accomplishing the activities.

Reese suggested that there was a great need for conferencing with colleagues about single subjects or interests, and that there was not a facility within the district to do

that. Harper indicated interest in building websites but time to learn and create them was a barrier. Also described was an interest in creating projects such as yearbooks, but did not have the technology or the knowledge. Harper had received previous training in Kid Pix and the scanner, but had not used it, and had forgotten how. Adair acknowledged an interest in PowerPoint or other multimedia programs, although no software was available in the school. An interest in independent math programs to support enrichment or adjusted programs, was also indicated, although there was not enough time in the lab, no support to teach and run the programs, or money to purchase them. Adair also added that a projector was necessary to support learning and view projects, a colour printer to create and display projects, and a mini lab in each classroom would be of interest, but there were no funds available to purchase the equipment. Maitland indicated an interest in animation and video editing, but the software, equipment and training was unavailable. Dakota also acknowledged an interest in video editing and manipulating photos with kids as an empowering tool for multimedia, which was a big part of a presentation, but the resources were unavailable. Maitland also identified an interest in using Adobe Acrobat, but there was a need for an upgrade to the operating system. Baden indicated an interest in more training for the lab administrators as there was not enough or adequate training.

The lab administrators also indicated other reasons for being unable to accomplish some of the activities. Both Dakota and Harper recognized a lack of funding for software, with Harper adding that the reasons for being unable to do the activities were time, access to training or help. Tait explained that programs were available at the school, but not in use, as a scanner and a computer were waiting for installation.

The lab administrators suggested solutions to some of their concerns. Baden identified release time for lab administrators to train with the classroom teacher in the uses of the programs. Harper declared teachers should always use the technology training, or the knowledge would be lost. Reese indicated that there were solutions, but sometimes there were roadblocks, that could be taken down, when a teacher could defend the reason for needing the technology to work a certain way, for the educational value of it.

14. Anything else you would like to include.

The lab administrators identified anything else that they would like to include. Common themes appeared within the answers. The themes were technology literacy, resources, technical support, teacher needs, and other comments.

Teachers appeared more comfortable with computers but the literacy level had declined, stated Reese. There were many reasons identified for the decline which were “the direction the district has gone, lack of money, politics, and teachers abdicating the responsibility to others”. Reese also explained that literacy was an understanding of how and why technologies work, and only one university in the province required teachers to take a technology course.

Dakota indicated that the Microsoft Office Package, Internet for research and Publisher were the programs used. Software programs such as games and older versions of programs previously purchased, when technology first entered the schools, were underutilized. Also suggested was that with a lack of resources, teachers needed to be creative and resourceful when using what was available.

Harper supported more district technical support and quicker service, as the wait time for having software programs installed, or computers fixed, was sometimes too long. Maitland also added that repair time was too long, and that computers required support, and was therefore surprised that the computer use was as much as it actually was. Maitland suggested that technicians were overworked and they were not educators, therefore they did not understand educational needs. Tait declared that a requirement was a fair share of a technician's time instead of the high schools getting most of it. Adair indicated that computer labs were down for long periods and that no one was available to do computer repairs for months.

Maitland was concerned that there was no resource person responsible for technology and very few staff members in each school who were skilled computer users. Maitland also specified that each classroom have a multimedia projector, video camera and a computer dedicated strictly for the teacher. Baden suggested that there was a need for lab administrators to receive technical training, from technicians, and for teachers to receive application support from teachers who had the skills. Tait felt that school support teachers needed laptops to record information and be more efficient with their time by recording meetings.

Adair concluded that technology was changing very fast and that most students did not come to school to use computers as they had them at home. Also explained was that there was a need to spread the technology money evenly throughout the district. Maitland declared that the people at the top were doing nothing where computer technology was concerned and that what was going on with computers in the province was a "total crime".

Chapter 5

Discussion

The purpose of this study was to investigate teachers' understanding and needs with respect to educational technology, along with their ideas and practices concerning the teaching of technology at the intermediate level (grades 4 to 7). By understanding the needs of the teachers, a plan could be established to strengthen the technology program within the intermediate classroom.

The survey questions focused on what skills teachers were teaching in the grade four to seven computer classroom, how teachers were presenting these skills to the students, how comfortable teachers were with their personal computer skills and with teaching computers at the elementary level, and whether all students received the same level of skills at their grade level.

Computers can have a very positive effect on students and teaching. The researcher wanted to explore two concepts: what is taught in the intermediate grade 4-7 technology program, and then make suggestions based on the findings, as to methods for making the elementary program effective and engaging for all students. The findings also lead to suggestions for technology education offerings at professional development conferences. The recommendations and findings could also be applied to teacher education programs. It is hoped that by helping teachers to become more computer literate, they may see the potentials associated with the applications of technology in the classroom.

The findings for this research are discussed in six sections. The six sections include the demographics, stand alone curriculum and scope and sequence, training,

computer use, benefits, and barriers. The demographics section describes the teachers' and the lab administrators with respect to their comfort level, grade level and teaching experience. The second section describes the teachers' and lab administrators' opinions on a stand alone curriculum for technology. This section also identifies the number of teachers using the district's draft scope and sequence. The third section identifies the teachers' previous training and their training requirements. The fourth section describes the uses of the computer in the elementary grade 4 to 7 classrooms. The next section identifies the perceived benefits to the students and teachers. The last section describes the barriers identified with respect to teachers and teaching computers. Also included in this chapter is a conclusion and recommendations for future research.

The data collected came from two sources. The first source was a survey sent out to 205 grade 4 to 7 elementary school teachers working in 31 schools within the district. There were 66 questionnaires returned which represented 32% of the questionnaires. The second source of data was interviews with lab administrators, who may also have been teachers in their school. All elementary lab administrators in the district were invited to participate. Six lab administrators and one former lab administrator volunteered to participate in the interview process.

Demographics

There were 66 teachers who are instructing in single grade or split grade classes who completed the questionnaire. The largest number of teachers who responded to the survey had taught grade 4. Forty-four percent of the teachers and 71% of the lab administrators had taught more than 21 years. Most of the lab administrators were

teaching students in multiple grades and 57% were in the position of lab administrator for 10 or more years.

When comparing the teachers' comfort level when using computers to the teachers' comfort level when teaching computers, there was no distinct pattern found, although there was a higher percentage of teachers who claimed to be more comfortable using computers than teaching computers. A number of teachers indicated that they did not teach computers. The most common reason for not teaching computers was that some teachers swapped subjects with another and some teachers stated they were not comfortable using computers as they had little or no training. The lab administrators appeared to be more comfortable using computers than most of the classroom teachers who responded to the questionnaire.

Stand Alone Curriculum, and Scope and Sequence

The scope and sequence for technology in the district is a draft document, and with the elimination of the district's technology resource teacher three years ago, it is incomplete. A very small percentage of teachers are using the draft scope and sequence; other teachers indicated that they had only seen the document and still others claimed to be unaware of it. There is no mandatory criteria established at the district or provincial level, this allows teachers to choose whether technology integration is important to them.

There was a mixed response from both the teachers and the lab administrators as to whether there should be a stand alone curriculum and no conclusion could be made. However, there was confusion concerning a stand alone curriculum for technology, as a number of teachers did not respond to the question and others indicated that they were unsure. The lab administrators also had mixed opinions about a specific curriculum. All

lab administrators agreed that there should be a set of guidelines for teachers to follow, and some of the lab administrators claimed that the guidelines should be consistent across the province. Some lab administrators indicated that the guidelines should be integrated into other subjects' IRP and not taught in isolation. One of the concerns is that there is no set standard for computers and technical support. Some schools would be at a disadvantage, as many of the new programs will not run on the older computer equipment. Another concern is teachers already have a huge number of learning outcomes to cover, and adding more to their workload would be unrealistic. Another concern is that the teachers' computer literacy level is low and they would require substantial additional training and support.

Training

A majority of teachers had some formal computer training although it appeared to primarily cover skill building. Teachers and lab administrators indicate interest in many different technology workshops. A main difference is that some of the lab administrators are interested in higher levels of integration. The lab administrators' suggestions for workshops included best uses of technology in the classroom, topics with an educational focus on integration and networking with colleagues, as well as discussions about the vision of technology in the future classroom. The teachers and the lab administrators both agree that some of the skill building workshops should include PowerPoint, word processing, Internet, email, Excel, and a drawing and painting program (Kid Pix). Both groups also suggest that web page design, animation, web quests, and digital imaging were also of interest.

The lab administrators and teachers indicate that workshops need to teach both skills, with easy to follow lessons, and the integration of technology with other content areas. The research by Yaghi (1996) and Zhao, Pugh, Sheldon and Byers (2002) also suggest that there is a need for teacher training. They suggested that the focus be on skills acquisition so that teachers are more comfortable and confident using computers, and this will allow integration to occur. Ertmer et al. (1999) also claim that the need for continuous ongoing dialogue will help teachers to develop the skills and build confidence and they will become more aware of the potential of technology education. The skills' workshops would help teachers to build skills and confidence when using the technology. The skills' workshops could be a series of multilevel classes, having follow-up, trouble shooting and brush up sessions. All agree that time to develop the skills is of paramount importance!

Teacher training is important and the training needs to be continuous training over at least seven years suggests Petty (2002). The teachers, lab administrators and the literature by Wilson et al. (2003) also suggest workshops take place during professional development days or release time. Teachers are tired at the end of the day, and it is difficult to assimilate the technical information. Workshops should ideally be at the home school as the equipment is familiar. Teachers also indicate that a specialist teacher is required in each school, to teach a proper program and keep up with the technology. One teacher and research by Petty (2002) indicate that having a specialist work with the class and the classroom teacher is beneficial. The team teaching and modelling approach provides a positive learning environment for all involved. Lab administrators also suggest

that computer programs should be available for home use while developing the skills for that program.

Computer uses

The teachers and the literature by Franklin (2003) identify that the most frequently taught computer applications are word processing and Internet skills. Many teachers also incorporate typing skills and instructional games into their teaching plans. Only a few teachers taught drawing and painting skills, spreadsheet skills, PowerPoint skills, and database skills. No pattern was perceived as to why a teacher did not teach all of the skills, other than the teacher's comfort level. The lab administrators incorporate the Internet, word processing, web quests, novel studies, PowerPoint, typing, and database activities into their teaching.

The teaching strategies most frequently involved project work, verbal step by step approach, exploration, and practice strategies. There is no discernable pattern to determine whether one grade level used a group of strategies more. The lab administrators also indicate that they use project based activities.

Some teachers and lab administrators integrate technology into their teaching. One lab administrator claims that the computer is an integral part of the classroom, like the desks and the chairs. The computer is in the class for all to use whenever it is required for learning purposes. Dias (2001) identifies the five best practices of teaching using technology. These include problem solving multidisciplinary units, determining the end result and deciding whether technology will enhance the learning process, collaborating with others inside and outside the classroom, scaffolding for understanding, and incorporating both hard and soft technologies.

Benefits to Students and Teachers

There are numerous benefits to having access to computers for teaching and learning. One of the students' benefits is their comfort level with the technology both at home and at school. With technology in the schools, the technology makes learning more authentic as the students can learn the same way at school as they do at home. The students can draft work as well as spell check and edit their work. The lab administrators state that the students love computers and they are a motivational tool even for those students who struggle to complete assignments. Duhaney and Zemel (2000), Ertmer et al. (1999), Franklin (2004), Kleiman (2000), Maier (2002), Medina et al. (2001), Peck and Dorricott (1994), and Yaghi (1996) also state that computers are a motivational tool for students. Duhaney and Zemel add that students become actively involved in the process of learning. Maier indicates that students are eager, interested, involved, and having fun.

Computers and other technologies give students more independence as computers allow teachers to differentiate the curriculum, allowing students to work at their own pace. Ertmer et al. (1999), Kleiman (2000), and Peck and Dorricott (1994) all identify that individualization and meeting the goals of the students is a benefit to the students. Kleinman also claims that technology also provides students with the opportunities to develop their strengths and learning styles at their own pace.

Teachers, lab administrators, and the literature also express that there are benefits to teachers when using technology. One benefit includes rich learning materials, resources, and suggested lesson plans, all assisting teachers in organizing their lessons and visually demonstrating information. As well, teachers have access to web based projects such as web quests. Ertmer et al. (1999) states that lessons become more

interesting when accessing the materials and using presentation software to enhance the lesson. Technology also makes record keeping easier and report card writing quicker. Computers provide teachers with opportunities to communicate and collaborate with colleagues, parents, and students. McCannon and Crews (2000), Medina et al. (2001) and Peck and Dorricott (1994) also identify that communication is a benefit.

Barriers for Teachers and Teaching Computers

The lab administrators identify activities that they would like to use and see other teachers using, including conferencing with colleagues, creating websites and yearbooks, producing PowerPoint or other multimedia projects, video editing, and photo manipulation, and enrichment programs for math. In addition, they identify the barriers that prevent teachers from doing these activities, which include personal and professional priorities, and lack of training, funding, and technology support.

One barrier is the personal and professional priorities of the teacher. Hannafin and Savenye (1993) state that the failure to effectively change the education system is due to the teachers' inability to change their teaching styles. Technology curriculum is not mandatory, and a teacher may feel that it is not important to teach the skills, or that other subject areas or skills may be more important. Teachers make unilateral decisions about what to teach in their classrooms based on their backgrounds, interests, and comfort level.

Wilson et al. (2003) identifies that the technology is changing so fast that the teachers are unable to incorporate the new technologies into their teaching. A lab administrator states that the amount of time devoted to technology is a frustrating factor for teachers. There is a constant need for updating their skills and being aware of the new problems that could arise while using technology. The teachers and lab administrators

also indicate that teaching students the proper skills is required when searching for information, as well as teaching them that not all the information on the internet is relevant or reliable. Monitoring students is also required as some students may modify the computer settings, play games instead of completing assignments, and search inappropriate sites.

Another barrier is that not all teachers' have the same skill level. The Holland (2001) and Kleiman (2000) studies both identified five similar stages of development that learners experience when developing skills concerning the integration of computers in their classrooms. If teachers have not progressed through a particular stage of development yet, then they would be unable to teach the skill comfortably.

A lack of teacher training creates other barriers. With no provincial guidelines or a district scope and sequence, teachers can only work with what is comfortable for them. The teachers, lab administrators, and research by Carter (1997), Ertmer et al. (1999), Kleiman (2000), O'Neil (1995), Wilson et al. (2003) and Yaghi (1996) also identify a requirement for more access to teacher training. One administrator in a study by Carter (1997) indicated that the teachers' limited knowledge causes more problems, and requires more time to fix the problems.

Teachers' access to the technology is limited by the lack of funding. The school may not have the programs available, the equipment working correctly, or enough equipment to teach, using that software. Therefore, teachers would differ widely in choosing the activities and programs. Software and hardware are necessary when video editing, manipulating photos, and creating PowerPoint presentations, as well as other activities. As well, teachers require access to online computers that work properly and are

located conveniently for their use only. Access to other technologies such as multimedia projectors for the classroom and video equipment are also suggestions from lab administrators.

A further barrier for teachers is that the technology support is inconsistent. Bailey (1997) states that the limited technology support that teachers receive causes some teachers to avoid using the technology. Teachers become frustrated when faced with technology that is down and unreliable. Teachers and lab administrators reinforced by the literature, support a faster response to technology repair time, which would likely increase the teachers' faith in technology and increase their desire to use it. Bailey also identifies two types of support needed. The first is technical assistance, which is the job of a technician to keep the equipment running. The other assistance requires a knowledgeable technology person to help teachers with integration concerns. The lab administrators and the teachers also identified the need for a resource person and technology leadership in each school.

Conclusion

The information from this research study and the literature suggests that the same problems, with respect to technology in schools, have existed since 1985. Lack of funding, teacher support and a joint vision continue to be the problems of today. Providing computers in the classroom is not all that is required, as the teachers, most importantly, require adequate training. Training is a predominant theme in both the interviews and the literature. The goal is computer integration, hence adequate funding is mandatory to train all staff on an ongoing basis. There must also be a technology specialist in every school to provide opportunities for teachers to grow technologically.

Students must have ongoing opportunities to develop the skills and become technologically literate in order to join the work force. I believe that every student must become computer literate, and the earlier learning takes place, the more comfortable a student will be using the new materials and tools. School districts and the Ministry of Education must develop a plan to integrate technology into the classroom. School districts must develop budgets that fund newer computers and build up a computer literate workforce. Computer learners must have time to use the technology, to support learning, to communicate effectively, to explore and discover, thereby developing their understanding of its benefits, limitations, and potentials. Establishing a technology plan can create a learning environment for the students, that is beneficial to learning and dynamic. By allowing students to discover and play with the technologies a teacher is empowering the students to continue learning.

Recommendations

My recommendations supported by this research and the literature suggest that, if educational institutions want to improve the quality of technology education, a more encompassing overall plan to address the needs of a technology integration program must be developed. The areas to be considered in the plan are:

- 1) a set of expectations and guidelines for teaching technology that address the learning requirements;
- 2) adequate time for training and support for teachers, which includes follow-up sessions for both skill development and the sharing of integration strategies;
- 3) adequate technical support and communication among all the interested parties;

- 4) convenient access to technology and continuous upgrading of the technology.

These factors must be in place to develop an interest for teachers and build confidence in the technology community.

Further study into what teachers are teaching is encouraged. Some suggestions are:

- 1) An analysis of teacher descriptions of their experiences while teaching the use of computers.
- 2) A comparison of the skills taught in the primary and secondary programs with the results from this research.
- 3) A comparison of what teachers are teaching in this district to other districts in the province and across Canada.
- 4) Investigation into the impact that computers have, if integrated from grade 4 to 7, on the students' achievements in high school.

Suggestions for additional questions would include:

- 1) How do you, as the teacher, integrate technology within the classroom?
- 2) What are your beliefs about technology use in the classroom? How does technology have an impact on your teaching?
- 3) Do you find lab access adequate? Is there another way that you would like access to the computers?

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Appendix A
Letter of Initial Contact to the Superintendent

December 16, 2004

Rick Borelli (Superintendent)
School District 68 (Nanaimo-Ladysmith)
395 Wakesiah Avenue
Nanaimo, B.C. V9R 3K6

Dear Mr. Borelli:

RE: Requesting approval for a research project within School District 68.

My name is Ann-Marie Brayden and I am currently a graduate student at the University of Victoria as well as an elementary teacher within this school district. I am working towards completing my Master's of Arts degree in Curriculum Studies with a focus on integrating technology into the elementary classroom. As a graduate student, I am required to complete a research project and I have chosen to look at how technology is integrated into the elementary classroom with a specific focus on the grades 4 to 7.

I am seeking permission to do this study in School District 68 as I work within this district and would like to see equality within the technology department at the elementary level. This study, An investigation of computer technology instruction in the elementary classroom, will involve teachers currently teaching at the grade 4 to 7 levels. I would like to hand out questionnaires and request volunteers for interviews in January-February. It is my intention to have all the research completed by the end of March.

The purpose of this study is to determine what is being taught in the elementary grade 4 to 7 classrooms. The questions will focus on: what skills teachers are teaching in the grade 4 to 7 classroom; how teachers are presenting these skills to the students; do teachers feel that they are adequately prepared for teaching computers at the elementary level; and do all students receive the same level of skills at their grade level.

The results of this project may help inform teachers about what is being done in the elementary grade 4 to 7 computer class and to give suggestions and information on how to get support for teaching computer technology. This would give the district input from teachers on what they would like to see incorporated into our current system. It would also benefit teachers, who are interested in preparing activities for training other teachers to integrate computer technology into their classrooms, by giving them ideas as to what teachers may need and want. It may also provide ideas and suggestions that will encourage equality so that all students received the same standard of technology instruction, regardless of the teacher's current skill level.

The methods of acquiring the data will be a questionnaire given to all grade 4 to 7 teachers and interviews of lab administrators who volunteer. The teachers' participation

in this study will be on a voluntary basis. The teachers' names will not be a part of the study. There will not be any record or identification marks on the questionnaire. The interview transcripts will not have the participants name but will be identified by a code name. The data will be kept in a secure place in my home and will be destroyed once the thesis has been successfully accepted.

Upon completion of this study, a report will be made available to this school district and the University of Victoria as well as a possible professional article. If you have any questions regarding any aspect of this study please feel free to contact me at home phone (250) XXX-XXXX*. Should you wish to verify any information in regards to my research you may call my Faculty Supervisor, Dr. Leslee Francis-Pelton phone (250) 721-7794 or you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Associate Vice-President Research at (250) 472-4545 or ovprhe@uvic.ca.

Thank you for taking the time to consider my request.

Sincerely,

Ann-Marie Brayden
xxx@xxxxxxxxxxxxxx*

Attachments:

- 1) An email of approval for the project from University of Victoria – the official signatures will be forwarded as soon as I receive them
- 2) Teacher Questionnaire Consent Letter
- 3) Lab Administrator Information Letter and Consent Letter
- 4) A copy of the Application for Ethics Approval for Human Participant Research
- 5) Draft questionnaire and interview questions

* For privacy reasons these numbers were removed from this document



Today's Learner -
Tomorrow's Future

Appendix B
Consent Letter from School District

101
Office of the Superintendent/CEO
395 Wakesiah Avenue
Nanaimo, B.C. V9R 3K6
Telephone: (250) 741-5231
Fax: (250) 741-5218

December 17, 2004

Ms. Ann Marie Brayden
2570 Stampede Trail
Nanaimo, B.C.
V9T 5S4.

Dear Ms. Brayden:

Thank you for your letter of December 16, 2004, requesting permission to conduct a research project focusing on integrating technology into the elementary classroom as part of your professional studies. I note that your project has been approved by the Ethics Review Board of the University of Victoria. It is my understanding that in order to conduct your research you will be seeking volunteers from grades 4 - 7 teachers and lab administrators in School District 68 and it is your intention to have your project completed by the end of March 2005. I also understand that volunteers in your project will complete a questionnaire and that their names will not be part of the study nor will there be any record of identification marks on the questionnaire.

School District 68 is pleased to advise that your research request is accepted in principle knowing that projects of this nature benefit both staff and the District.

A list of guidelines has been prepared from the School District's perspective to assist individuals undertaking research projects/studies within the District. Compliance with these guidelines will ensure ongoing district support for your study.

1. Participation by staff is voluntary.
2. Participation by students is also voluntary and predicated on parental/guardian permission.
3. Participation by parents and/or others in the community is voluntary.
4. Video/Audio tapes of students must have the prior written approval of the parent/guardian. The purpose and use of the video/audio must be clearly articulated, as well as where it will be used.
5. The report may refer specifically to School District 68 (Nanaimo-Ladysmith); however, it may not refer to specific schools by name.
6. Naming staff members in the report may occur only where express written permission has been received from the staff member.
7. Naming students in the report may occur only when express written permission has been received from the parent/guardian.
8. Naming parents in the report may occur only where express written permission has been received from the parent.
9. The district will be provided with its own copy of the project report. A copy should be sent to the Superintendent's office.

In the event that you have any additional questions, please contact the Superintendent's office for further clarification.

On behalf of the School District, I wish you much success as you involve yourself in this important research project.

Yours truly,

Rick Borelli
Superintendent of Schools

Appendix C
Teacher Questionnaire Consent Letter

January 2005

Dear Teachers at the grade 4-7 level:

My name is Ann-Marie Brayden and I am currently a graduate student at the University of Victoria as well as a teacher within the school district. I am working towards completing my Master's of Arts degree in Curriculum Studies with a focus on integrating technology into the elementary classroom. As a graduate student, I am required to complete a research project, An investigation of computer technology instruction in the elementary classroom. I have chosen to look at how technology is integrated into the elementary classroom with a specific focus on grades 4 to 7.

I am contacting all grade 4 to 7 teachers in District 68 and requesting your support to complete a questionnaire. The purpose of this study is to assess what teachers are teaching in the elementary classroom and to determine ways to create equality for all students using technology at the elementary level. This project may also provide information to teachers wanting to produce activities for teachers who teach in a computer classroom. Attached is a questionnaire that should take about fifteen minutes to complete.

If you agree to volunteer by completing the questionnaire form, it will be completely anonymous. Your name will not appear in the report nor will it appear on any of the data that is collected. Once I have received the questionnaire, it will be kept at my home in a locked cabinet.

Please note that your participation in the study is completely voluntary and you may choose not to participate by not completing the questionnaire. As there are no identification marks on the questionnaires that have been returned to me they will become part of the study and will not be returned. The questionnaires will be destroyed at the end of this research project.

Upon completion of this study a report will be made available to this school district and the University of Victoria as well as a possible professional article. If you have any questions or concerns please contact me at (250) XXX-XXXX*. If you wish to verify this research project, please contact my Faculty Supervisor, Dr. Leslee Francis-Pelton at (250) 721-7794 or you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Associate Vice-President Research at (250) 472-4545 or ovprhe@uvic.ca.

Completion and return of the questionnaire indicates your consent that you understand the above information in regards to your participation in this study.

Thank you,

Ann-Marie Brayden
xxx@xxxxxxxxxxxxxx*

Please keep a copy of this letter in case you want to contact the researcher or the supervisor.

* For privacy reasons these numbers were removed from this document

Appendix D
Lab Administrator Information

January 2005

Dear Elementary and Intermediate Lab Administrators:

My name is Ann-Marie Brayden and I am currently a graduate student at the University of Victoria as well as a teacher within the school district. I have two years experience as a Lab Administrator but currently do not hold the position in the school I am in. I am working towards completing my Master's of Arts degree in Curriculum Studies with a focus on integrating technology into the elementary classroom. As a graduate student, I am required to complete a research project, An investigation of computer technology instruction in the elementary classroom. I have chosen to look at how technology is integrated into the elementary classroom with a specific focus on grades 4 to 7.

I am contacting all lab administrators in an elementary or intermediate school in District 68 and requesting your support to complete an interview. The purpose of this study is to assess what teachers are teaching in the elementary classroom and to determine ways to create equality for all students using technology at the elementary level. This project may also provide information to teachers wanting to produce activities for teachers who teach in a computer classroom.

If you agree to volunteer by completing an interview, your responses will be kept confidential. Your name will not appear in the report nor will it appear on any of the data that is collected. Once I have received the consent form, I will randomly choose 5-8 people to interview. I will set up a convenient time to meet to do the interview which will be recorded; then I will transcribe it and return it to you for approval or corrections. The documents will be kept at my home in a locked cabinet.

Please note that your participation in the study is completely voluntary and you may withdraw at any time prior to returning the transcription. There will only be a code name on the interview transcript and once returned to me they will become part of the study and will not be returned. The documents and the audio recording will be destroyed at the end of this research project.

Upon completion of this study, a report will be made available to this school district and the University of Victoria as well as a possible professional article. If you have any questions or concerns please contact me at (250) XXX-XXXX*. If you wish to verify this research project, please contact my Faculty Supervisor, Dr. Leslee Francis-Pelton at (250) 721-7794 or you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Associate Vice-President Research at (250) 472-4545 or ovprhe@uvic.ca.

Completion and return of the attached interview consent form indicates your consent that you understand the above information in regards to your participation in this study.

Thank you,

Ann-Marie Brayden
xxx@xxxxxxxxxxxx.xx*

Please keep a copy of this letter in case you want to contact the researcher or the supervisor.

* For privacy reasons these numbers were removed from this document

Lab Administrator Interview Consent Form

To the Researcher:

This letter is to confirm that I agree to be part of the interview process for the research by Ann-Marie Brayden.

I understand that my participation is completely voluntary and I may withdraw at anytime prior to returning the transcript to the researcher. I also understand that any completed documentation will be used as research for the study and that my name will not appear within the documents. All documents will be kept in a safe place at the residence of the researcher until the end of the research study and will then be destroyed.

By completing the below information, I am aware that I have given the researcher written permission to be considered for an interview. I may still withdraw at any time. I am also aware that not everyone who volunteers will be chosen to be interviewed. The interviewee will be selected by a random selection.

_____ Print name
 _____ Signature
 _____ Phone number
 _____ Best time and days to call the above number

Please complete the questions below and send this form to the researcher. Please do not put this form in the envelope, with the questionnaire, as the questionnaire is anonymous.

1. How long have you been a Lab Administrator? _____
2. How long have you been teaching? (Check the one that applies to you)
 - 0-5 years
 - 6-10 years
 - 11-15 years
 - 16-20 years
 - 21+ years
3. What would you say is your comfort level on a computer? (Draw a line crossing the existing line of your comfort level)



Not comfortable

Very comfortable

Please send this copy back to the researcher in the envelope provided.

Appendix E
Teacher's Questionnaire

Section A. Demographics

1. What grade do you teach? (if a split class circle both) 4, 5, 6, 7

2. Do you have access to the District Draft Scope and Sequence for Technology document?
Yes or No or Have never seen one

3. Are you using the Scope and Sequence this year to plan your computer program?
Yes or No

4. How long have you been teaching? (fill in the box that applies to you)
 - 0-5 years
 - 6-10 years
 - 11-15 years
 - 16-20 years
 - 21+ years

5. What would you say is your comfort level on the computer? (Draw a line crossing through the existing line to indicate your response)

●—————●

Not comfortable Very comfortable

6. Where is your comfort level in teaching computers at the elementary level? (Draw a line crossing through the existing line to indicate your response)

●—————●

Not comfortable Very comfortable

7. Do you have any training in computer technology? Yes or No
If yes, please indicate course name or topic
 - University or College Courses – _____
 - Workshops – on own – _____
 - Workshops – Pro-D – _____
 - In-service Training – _____
 - Other: _____

8. Do you teach computers at the grade 4-7 level? Yes or No
If yes, please go to question 10

9. Why do you not teach computers? Fill all boxes that apply
 - Not comfortable on computers
 - Have not had training
 - Do not feel computer technology is important
 - Focus is on other subjects
 - Swap with another teacher
 - Other: _____

Section B: Workshops

10. Would you like to attend workshops for activities/training on how to integrate computers into your classroom? Yes or No If No, go to question 13
11. What type of workshops would you like to be a participant in? (Please rank these in order of what would be most important (1) to least important (9) to yourself and leave blank if you have no desire to attend the type of workshop)
- _____ Word processing workshops
 _____ Internet use workshops
 _____ Email workshops
 _____ Drawing and Paint workshops
 _____ Producing PowerPoint Presentation Workshops
 _____ Building Web Page workshops
 _____ Using Spread Sheet workshops
 _____ Using Database workshops
 _____ Other: _____

12. Which type of presentation workshop would best suit you? (Please rank these in order of what would be most important (1) to least important (7) to yourself and leave blank if you have no desire to attend the type of workshop)
- _____ In-service workshops
 _____ After school workshops
 _____ Workshops in the evening
 _____ Workshops on the weekends
 _____ Professional Development days
 _____ In-school workshops such as a teacher with release time to work with you and your class
 _____ Other: _____

13. Would you like to see a stand alone Technology 4-7 Curriculum for the Province? Yes or No

Section C. Programs and skills you teach (if you do not teach computers go to question 17)

14. What programs have you used or are going to use in your computer classroom this year. (Fill all boxes that apply)
- Typing program
 Word Processing
 Internet Research/Information retrieval
 Drawing or Paint Program
 Instructional Games
 PowerPoint
 Hyper Studio
 Spreadsheet or Excel
 Database skills
 Web Building Program
 Email
 ACDSsee
 RoboLab or Mindstorm
 Other: _____

15. What types of strategies do you use when teaching computers? (Fill all boxes that apply)

- Skills teaching by lecture
- Verbal step by step procedure
- Written step by step procedure
- Drills
- Practice
- Project work
- Exploration
- Other: _____

16. Fill in all the boxes that apply to what you teach when working on each of the below programs.

<p>General</p> <ul style="list-style-type: none"> <input type="checkbox"/> Identify the parts of the computer <input type="checkbox"/> Use current terminology <input type="checkbox"/> Use a program that has been previously loaded <input type="checkbox"/> Turn on a computer and load a program <input type="checkbox"/> Other: _____ 	<p>Touch Typing</p> <ul style="list-style-type: none"> <input type="checkbox"/> Body Positions <input type="checkbox"/> Hand Positions <input type="checkbox"/> Identify specific keys <input type="checkbox"/> Typing tests for speed <input type="checkbox"/> Accuracy tests <input type="checkbox"/> Other: _____
<p>Word Processing</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ask students to type in project only <input type="checkbox"/> Ask students to type in project and then manipulate it <input type="checkbox"/> File management – save, save as, print, open, close, new <input type="checkbox"/> Edit: cut, copy and paste, delete and insert, undo and redo <input type="checkbox"/> Edit: change font, size, style and colour of text, bold and italics <input type="checkbox"/> Edit: Alignment <input type="checkbox"/> Edit: spelling and grammar <input type="checkbox"/> Selecting Text <input type="checkbox"/> Changing Margins <input type="checkbox"/> Find and replace <input type="checkbox"/> Create a document using tables <input type="checkbox"/> Create a document using columns <input type="checkbox"/> Add and manipulate graphics in a document <input type="checkbox"/> Other: _____ 	<p>Internet</p> <ul style="list-style-type: none"> <input type="checkbox"/> Launch browser to access the World Wide Web <input type="checkbox"/> Access information files and search sites <input type="checkbox"/> Use search engine for keyword searches <input type="checkbox"/> Use Boolean operators to narrow search criteria <input type="checkbox"/> Determining appropriate site skills <input type="checkbox"/> Add to favourites <input type="checkbox"/> Copy and paste images and material to another file source <input type="checkbox"/> Save search results <input type="checkbox"/> Send and receive electronic mail <input type="checkbox"/> Observe appropriate etiquette at all times <input type="checkbox"/> Participate in collaborative projects <input type="checkbox"/> Print selected material <input type="checkbox"/> Explain copyright/plagiarism issues <input type="checkbox"/> Other: _____

<p style="text-align: center;">Drawing and Painting Programs</p> <ul style="list-style-type: none"> <input type="checkbox"/> Create a line drawing <input type="checkbox"/> Change line colour and width <input type="checkbox"/> Create circles and boxes <input type="checkbox"/> Create freehand drawing <input type="checkbox"/> Use eraser and other tools to edit or create an image <input type="checkbox"/> Resize and reposition images <input type="checkbox"/> Flip, crop and rotate images <input type="checkbox"/> Add text <input type="checkbox"/> Import clipart <input type="checkbox"/> Add colour by filling shapes or background <input type="checkbox"/> Add texture to shapes or background <input type="checkbox"/> Use other tools such as magnify and eyedropper <input type="checkbox"/> Special effects such as spray brush <input type="checkbox"/> Other: _____ 	<p style="text-align: center;">PowerPoint or Multimedia Presentation such as Hyper Studio or Web Pages</p> <ul style="list-style-type: none"> <input type="checkbox"/> Navigate documents <input type="checkbox"/> Use correct terminology to describe techniques and tools <input type="checkbox"/> Integrate different media into a single document <input type="checkbox"/> Create a presentation or a document <input type="checkbox"/> Use special effects <input type="checkbox"/> Create basic animation and other visuals <input type="checkbox"/> Create a simple slide show presentation <input type="checkbox"/> Incorporate digital graphics <input type="checkbox"/> Other: _____
<p style="text-align: center;">Spreadsheets such as Excel or Works</p> <ul style="list-style-type: none"> <input type="checkbox"/> Use spreadsheet terminology <input type="checkbox"/> Describe the purpose of a spreadsheet <input type="checkbox"/> Recognize the parts of a spreadsheet <input type="checkbox"/> Use an established spreadsheet to find information <input type="checkbox"/> Add data <input type="checkbox"/> Change fonts <input type="checkbox"/> Change column widths <input type="checkbox"/> Create own spreadsheet <input type="checkbox"/> Sort Data <input type="checkbox"/> Create a graph or chart <input type="checkbox"/> Incorporate spreadsheet information and charts into other documents <input type="checkbox"/> Create legends/titles <input type="checkbox"/> Calculate values of cells <input type="checkbox"/> Write formulas <input type="checkbox"/> Other: _____ 	<p style="text-align: center;">Database</p> <ul style="list-style-type: none"> <input type="checkbox"/> Use database terminology <input type="checkbox"/> Use an established database to retrieve information <input type="checkbox"/> Input data to an established database <input type="checkbox"/> Sort data alphabetically and numerically <input type="checkbox"/> Save a database <input type="checkbox"/> Create a new database <input type="checkbox"/> Use search and find skills <input type="checkbox"/> Move from form to form <input type="checkbox"/> Switch from form to list <input type="checkbox"/> Modify fields <input type="checkbox"/> Change cell information <input type="checkbox"/> Select and move columns <input type="checkbox"/> Use copy, cut and paste <input type="checkbox"/> Save and print reports <input type="checkbox"/> Import information to other documents <input type="checkbox"/> Other: _____

17. Please use the space provided to include any additional comments regarding computer use in the elementary schools.

Responses to the Teacher's Questionnaire

Section A. Demographics

1. What grade do you teach? (if a split class circle both) 4, 5, 6, 7
 Grade Level Total

66

Gr. 3/4	Gr. 4	Gr. 4/5	Gr. 5	Gr. 5/6	Gr. 6	Gr. 6/7	Gr. 7
5	15	9	6	6	4	9	12

2. Do you have access to the Nanaimo and District Draft Scope and Sequence for Technology document? Yes or No or Have never seen one

Yes	No	Have never seen one	No response
32	8	24	4

Comments: no circled response but wrote 'maybe'; no circled response but wrote 'probably have one somewhere'; circled yes and wrote probably and also circled have never seen one; yes have access but have never seen one; yes then put a question mark at the end of have never seen one (?); and circled have never seen one but put a circle around the word Draft in the question and two question marks.

3. Are you using the Scope and Sequence this year to plan your computer program?
 Yes or No

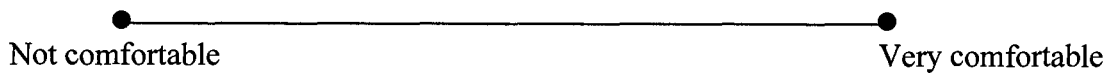
Yes	No	No response
9	56	1

4. How long have you been teaching? (fill in the box that applies to you)

Number of years of teaching experience per grade level

	Gr. 3/4	Gr. 4	Gr. 4/5	Gr. 5	Gr. 5/6	Gr. 6	Gr. 6/7	Gr. 7	Total
Total number of teachers who teach at grade level	5	15	9	6	6	4	9	12	66
0 to 5 years	0	1	0	0	0	1	0	1	3
6 to 10 years	0	1	2	0	1	1	4	3	12
11 to 15 years	2	3	2	1	2	1	1	3	15
16 to 20 years	0	1	1	1	1	1	1	1	7
21 + years	3	9	4	4	2	0	3	4	29

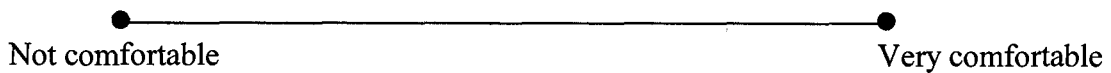
5. What would you say is your comfort level on the computer? (Draw a line crossing through the existing line to indicate your response)



Average comfort level per teaching grade level

Gr. 3/4	Gr. 4	Gr. 4/5	Gr. 5	Gr. 5/6	Gr. 6	Gr. 6/7	Gr. 7
6.4	5.2	5.2	6.7	5.7	6.4	7.3	5.9

6. Where is your comfort level in teaching computers at the elementary level? (Draw a line crossing through the existing line to indicate your response)



Average comfort level per teaching grade level

Gr. 3/4	Gr. 4	Gr. 4/5	Gr. 5	Gr. 5/6	Gr. 6	Gr. 6/7	Gr. 7
7.4	4.5	4.0	5.5	4.5	4.4	7.2	5.3

7. Do you have any training in computer technology? Yes or No

Yes	No	No response
47	17	2

If yes, please indicate course name or topic

<input type="checkbox"/> University or College Courses	15
<input type="checkbox"/> Workshops – on own	23
<input type="checkbox"/> Workshops- Professional Development days	40
<input type="checkbox"/> In-Service Training	31
<input type="checkbox"/> Other	4

Name or topic of Course

- University or College Courses
Introduction to computers (2 people), building a website using XHTML, How to produce worksheets, Master's Courses, PowerPoint (2), Computer Science (2), Two IBM network Admin Courses, Introductory computer course, Hyperstudio, One Course on Computers, Word 5.1
- Workshops – on own
Various programs like word processing, numerous, given taken numerous, CUEBC sessions, graphing
- Workshops – Pro-D
Student writing center, Digital Photo (3), Internet, using internet sites, accessing websites, using email (2), "computers in the classroom, etc, scavenger hunts, numerous, PC Globe, 2 on Publisher (2), Word for word processing (4), Websites, Webpage, Web building, Webquest (2), given taken numerous, PowerPoint, Excel, many software related courses, Logowriter, very little with knowledgeable staff members & district staff (when it was available): General, touch typing, graphics
- In-service Training
Pro Group in Nanaimo, two workshops a few years ago, kid's pick, SETBC laptop training, numerous, internet and various others, given taken numerous, Webquest, Rubric Making, In school technology & software inservice, Network Administrator (first year), PowerPoint, grading program, Reader Rabbit.
- Other:
Self-taught, own web business, also give professional PowerPoint shows, at home use only – trial/error, friends, my own children (unlike "technopeasant" mom), personal experience – I have been using computes for about 16 years.

8. Do you teach computers at the grade 4-7 level? Yes or No
If yes, please go to question 10

Yes	No
52	14

9. Why do you not teach computers? Fill all boxes that apply

<input type="checkbox"/> Not comfortable on computers	4
<input type="checkbox"/> Have not had training	3
<input type="checkbox"/> Do not feel computer technology is important	0
<input type="checkbox"/> Focus is on other subjects	4
<input type="checkbox"/> Swap with another teacher	13
<input type="checkbox"/> Other:	8

- Other:

Too many technical problems = high stress!, also taught in 'research' by Administration Team, my teaching partner does it – Unfortunately our computer lab has been basically out of commission for most of the first term. (A frequent problem), only teach .3 in classroom, not one of my subject responsibilities, most of the time I don't – sometimes I do teach, focus is on other subjects using computers, computer time is during my prep time, instruction provided by librarian or technology teacher.

Section B: Workshops

10. Would you like to attend workshops for activities/training on how to integrate computers into your classroom? Yes or No If No, go to question 13

Yes	No	No response
51	14	1

Yes response comment: when and if I have to teach in this area

No response comment: have already attended 3 or 4 times

11. What type of workshops would you like to be a participant in? (Please rank these in order of what would be most important (1) to least important (9) to yourself and leave blank if you have no desire to attend the type of workshop)

Number of responses to each workshop by the number of rated responses										
	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	Overall Total
PowerPoint	23	4	6	3	3		1			40
Web Pages	20	4	1	4	3	3	2	1		38
Internet	19	7	4	1	1		5	1		38
Spreadsheet	15	4	4	5	1	3	3			35
Word Processing	15	3		2	3	4	2	3	1	33
Drawing and Painting	12	2	7	5	1	4	2	1		34
Database	11	1	3	3	8	2		4		32
Email	3	1	1	2	3	3	2	5		20
Other	1						1	2		4

Other:

Better use of WebQuests as I still don't really understand. Digital Photography and integration across the curriculum.

Comments:

All are high priority, but I also need time to actually use and apply what I learn at the workshop (before I forget).

12. Which type of presentation workshop would best suit you? (Please rank these in order of what would be most important (1) to least important (7) to yourself and leave blank if you have no desire to attend the type of workshop)

Teacher's reported preferences for workshop presentation and the number of responses per choice

	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Overall Total
Professional Development Days	22	12	13	3				50
In-school	29	7	5	4	1			46
In-service	17	16	8	4				45
After school	4	2	7	19	1			33
Evenings	1		1	1	13	3		19
Weekends					2	14	2	18
Other							3	3

Other: The teachers who choose the other category did not indicate the type of presentation of workshop that they would be interested in.

Comments:
Rarely get in, always full.

13. Would you like to see a stand alone Technology 4-7 Curriculum for the Province?
Yes or No

Yes	No	Unsure	No Response
27	21	10	8

Comments:
I thought there was one; what does stand alone mean? Not integrated?; The whole technology curriculum is not of interest to me; not sufficient or adequate equipment to do this! What subject will we take this 'time' from?; with a computer teacher teaching it; don't understand; not sure; unsure; should I say "yes!" How is this different than what we have now?; but standardized systems/software would be an issue/funding

Section C. Programs and skills you teach (if you do not teach computers go to question 17)

14. What programs have you used or are going to use in your computer classroom this year. (Fill all boxes that apply)

Programs (applications) used by the number of teachers per grade level	Grade							Overall Total
	3/4	4	4/5	5	5/6	6	6/7	
Number of teachers	5	13	6	4	6	4	9	55
Number of responses	5	13	6	4	6	4	9	55
Word Processing	5	13	6	4	6	4	9	55
Internet	5	13	5	4	6	4	9	54
Typing	5	11	5	3	6	4	6	47
Instructional games	5	12	3	4	3	3	3	37
Drawing and Painting	2	4	1	2	2	1	6	19
PowerPoint	1	2	2	2	1	2	4	17
Email	2	2	1	3	2	0	2	15
Spreadsheet	1	1	2	2	0	1	3	12
Web Building	1	1	1	1	0	0	5	11
ACDSee	0	2	0	0	1	0	1	5
Database	1	0	1	0	0	0	1	4
Other	0	0	0	1	0	0	0	1

Other: Logo Writer and Programming

Comments: "All the rest, I don't know how to use."

15. What types of strategies do you use when teaching computers? (Fill all boxes that apply)

Teaching strategies used by the number of teachers per grade

	Grade 3/4	Grade 4	Grade 4/5	Grade 5	Grade 5/6	Grade 6	Grade 6/7	Grade 7	Overall Total
Number of teachers	5	13	6	4	6	4	9	8	55
Number of responses	5	13	6	4	6	4	8	8	54
Lecture	4	7	1	1	2	1	6	6	28
Verbal Step by step	5	11	6	4	4	2	8	7	47
Written Step by Step	1	6	3	3	5	2	6	6	32
Drill	5	7	3	3	3	3	3	5	32
Practice	5	9	4	4	4	4	4	7	41
Project work	4	10	5	4	6	4	8	8	49
Exploration	5	8	3	4	5	4	6	8	43
Other	0	1	0	1	1	0	1	1	5

Other:

Mini workshop by gathering students in small groups; projector; overhead to demonstrate how to navigate web pages; visual-digital Projector; Smart Board – visual step by step; and verbal step by step with projector

16. Fill in all the boxes that apply to what you teach when working on each of the below programs.

General skills taught by the number of the teachers per grade level

	Grade 3/4	Grade 4	Grade 4/5	Grade 5	Grade 5/6	Grade 6	Grade 6/7	Grade 7	Grade 8	Overall Total
Total number of teachers who teach at grade level	5	14	6	4	6	4	9	8	55	
Total number of teachers who responded	5	13	4	4	5	3	7	7	48	
Identify the parts of the computer	4	5	2	1	4	3	3	3	25	
Use current terminology	5	13	2	4	4	3	5	6	42	
Use a program that has been previously loaded	5	9	4	2	4	2	6	7	39	
Turn on a computer and load a program	3	5	1	4	3	2	4	2	24	
Other	0	1	0	0	0	0	0	0	1	

Other: unidentified

Touch Typing skills taught by the number of teachers per grade level

	Grade 3/4	Grade 4	Grade 4/5	Grade 5	Grade 5/6	Grade 6	Grade 6/7	Grade 7	Overall Total
Total number of teachers who teach at grade level	5	13	6	4	6	4	9	8	55
Total number of teachers who responded	5	11	5	3	6	4	4	7	45
Body Position	5	10	5	3	5	3	4	7	42
Hand Position	5	10	5	3	5	4	4	7	43
Identify specific keys	4	10	5	3	6	2	4	7	41
Typing tests for speed	4	9	5	3	6	2	3	7	39
Accuracy Tests	4	10	5	3	5	2	4	7	40

Comments:
All the write type; Waste of computer time in my opinion; self-taught; and don't teach it

Word Processing skills taught by the number of teachers per grade level

	Grade 3/4	Grade 4	Grade 4/5	Grade 5	Grade 5/6	Grade 6	Grade 6/7	Grade 7	Overall Total
Total number of teachers who teach at grade level	5	13	6	4	6	4	9	8	55
Number of teachers who responded	5	13	6	4	6	4	8	8	54
Ask students to type in project only	3	9	3	3	3	3	6	3	33
Ask students to type in project then manipulate it	3	9	3	3	3	3	5	7	36
File management - save, save as, print, open, close, new	5	13	5	4	6	4	7	8	52
Edit: cut copy and paste, delete and insert, undo and redo	3	11	5	4	6	3	7	8	47
Edit: change font, size, style and colour of text, bold and italics	3	11	5	4	6	4	7	8	48
Edit: Alignment	2	5	1	3	5	0	6	6	28
Edit: Spelling and grammar	4	11	5	4	6	3	7	8	48
Selecting Text	4	3	3	3	5	1	6	7	32
Changing margins	1	1	2	2	3	0	5	7	21
Find and replace	1	1	3	1	2	0	4	3	15
Create a document using tables	1	2	3	1	1	2	4	5	19
Create a document using columns	1	1	3	1	3	1	5	5	20
Add and manipulate graphics in a document	3	4	4	3	3	3	6	5	31
Other	0	0	0	0	0	0	0	0	0

Internet skills taught by the number of teachers per grade level

	Grade 3/4	Grade 4	Grade 4/5	Grade 5	Grade 5/6	Grade 6	Grade 6/7	Grade 7	Overall Total
Total number of teachers who teach at grade level	5	13	6	4	6	4	9	8	55
Number of teachers who responded	5	12	4	4	6	4	8	8	51
Launch browser to access the World Wide Web	5	10	4	3	6	4	7	8	47
Access information files and search sites	5	8	3	4	6	3	8	7	44
Use search engine for keyword searches	4	12	3	4	6	4	7	8	48
Use Boolean operators to narrow search criteria	0	1	0	2	0	0	1	3	7
Determine appropriate site skills	3	0	1	1	0	0	3	5	13
Add to favourites	2	7	1	3	3	1	3	5	25
Copy and paste images and materials to another file source	3	4	3	2	3	3	6	6	30
Save search results	1	2	1	2	6	0	3	6	21
Send and receive electronic mail	2	2	1	1	1	0	3	3	13
Observe appropriate etiquette at all times	4	7	2	4	2	2	4	6	31
Participate in collaborative projects	1	4	1	2	2	0	5	3	18
Print selected material	5	8	2	4	4	3	7	7	40
Explain copyright/plagiarism issues	3	3	2	3	5	3	7	8	34
Other	0	0	0	0	0	0	0	0	0

Other comment:

Email is not really appropriate at this level. Many students do not have email accounts.

Drawing and Painting skills taught by the number of teachers per grade level

	Grade 3/4	Grade 4	Grade 4/5	Grade 5	Grade 5/6	Grade 6	Grade 6/7	Grade 7	Grade 8	Overall Total
Total number of teachers who teach at grade level	5	13	6	4	6	4	9	8	55	
Number of teachers who responded	4	6	2	2	2	2	6	3	27	
Create a line drawing	4	3	1	1	2	1	4	2	18	
Change line colour and width	4	4	1	1	2	1	4	2	19	
Create circles and boxes	4	4	1	1	2	1	5	2	20	
Create freehand drawing	4	5	1	2	2	1	5	1	21	
Use eraser and other tools to edit or create an image	4	5	1	2	2	1	5	1	21	
Resize and reposition images	4	3	1	2	2	2	4	3	21	
Flip, crop and rotate images	2	3	1	1	2	1	4	3	17	
Add text	3	4	1	1	2	1	5	1	18	
Import Clipart	1	3	2	1	2	1	5	3	18	
Add colour by filling shapes or background	4	4	1	2	2	2	4	2	21	
Add Texture to shapes and background	3	4	1	2	2	1	4	2	19	
Use other tools such as magnify and eyedropper	3	3	1	1	2	1	4	0	15	
Special effects such as spray brush	2	2	1	2	2	1	5	2	17	
Other	0	0	0	0	0	0	1	0	1	

Other: Not available

PowerPoint skills taught by the number of teacher per grade level	Grade										Overall Total
	3/4	4	4/5	5	5/6	6	6/7	7	8	9	
Total number of teachers who teach at grade level	5	13	6	4	6	4	9	8	55		
Number of teachers who responded	0	2	3	1	1	1	4	3	15		
Navigate Documents	0	2	1	1	1	0	2	2	9		
Use correct terminology to describe techniques and tools	0	2	1	1	1	0	2	1	8		
Integrate different media into a single document	0	2	1	1	1	0	2	2	9		
Create a presentation or a document	0	2	2	1	1	1	3	3	13		
Use special effects	0	2	2	1	1	0	2	2	10		
Create basic animation and other visuals	0	1	2	1	1	0	1	1	7		
Create a simple slide show presentation	0	2	2	1	1	1	3	3	13		
Incorporate digital graphics	0	2	1	1	0	0	2	2	8		
Other	0	1	0	0	0	0	0	0	1		

Comments: I'm learning PowerPoint now and intend to use it with students, Don't know how.

Database skills taught by the number of teachers per grade level

	Grade 3/4	Grade 7	Overall Total
Total number of teachers who teach at grade level	5	8	13
Number of teachers who responded	1	2	3
Use database terminology	1	1	2
Use an established database to retrieve information	1	1	2
Input data to an established database	0	1	1
Sort data alphabetically and numerically	0	1	1
Save a database	0	1	1
Create a new database	0	1	1
Use search and find skills	1	1	2
Move from form to form	0	0	0
Switch from form to list	0	1	1
Modify fields	0	1	1
Change cell information	0	1	1
Select and move columns	0	1	1
Use copy, cut and paste	0	1	1
Save and print reports	0	1	1
Import information to other documents	0	1	1
Other	0	1	1

Comments:

Most Database programs are too complicated for elementary students. I use Excel to do many of the things that a database can do; Not sure how; and Not available.

17. Please use the space provided to include any additional comments regarding computer use in the elementary schools.

Teacher comments about teaching computers

- I find it very enjoyable teaching computer skills as the students enjoy it so much.
- Computers should enhance the curriculum not be a subject alone.
- The kids can do many of the above skills, but I can't!
- It is my experience that fewer teachers are actually teaching IT skills since the district dropped the position of IT resource teacher.
- Honestly, at this level, computers is the least important subject to get through when so many other materials are needed to be covered in the year.
- I find that anything I take days to teach them they can learn in one sitting at home. One-on-one.

- It is not well taught. Just becomes game playing. Last year I was in school that had good CD Roms locked up. As a new teacher, I was not given a key. My kids never got to use them.
- My computer time is taught during my prep; otherwise I would likely be doing it (with a reasonable amount of comfort in doing so).
- Computers in our school are not utilized to potential because of the problems.

Itinerants

- I would like to see several itinerants working with small groups in classroom.
- I teach four grade 7 classes and feel that an IT specialist is a good idea.
- We need specialized teachers to keep up with this technology.
- We need specialists to teach a proper program.
- We have been lucky to have an instructor from our school teach one day per week (team-teaching) to teach students and teachers programs. I have learned so much this way.

Workshops

- Would prefer onsite workshops. A fellow staff member will give a PowerPoint lesson soon.
- Not making as effective use of the computers as I could be due to lack of knowledge.
- We use computers as a tool and participate in workshops to learn new programs.
- Teachers need training. Easy to follow lessons.

Computers are used for

- On the plus side I use computers for retrieval of information as we do not have adequate texts and library resources.
- When I did teach computers, I worked with my class in the categories – general, touch typing, word processing and Internet only.
- Used flash or swish in previous grade; used spreadsheet/database when teaching grade 5, use Text Aloud.
- We don't teach "telephone" or "TV". We use them as a tool.

Time in the lab

- Not enough time in computer room.
- We do not have a lot of class time in the lab. We only get one session per week during my instructional time.
- I'd like to be able to utilize our lab in my library teaching time as well, but it's very hard to have flexible access to the lab.

Computer Equipment

- Old computers.
- Not enough for one for each student.
- No 'classroom' computer.
- Need more computers in class.
- I think Labs are a waste of time. We should all have four to six computers in each classroom rather than thirty-two in a lab.

- Our lab doesn't work properly 50% of the time, so what is the point?
- Skills I would like to teach (like PowerPoint) are not possible because of limitations in computer lab (eg. Software not available or doesn't run on some computers).
- Do not have working computers in classroom and not enough working computers for class size in lab! It is difficult to make computers an important component when equipment is old, outdated, not functioning, and not available!
- Most labs underpowered for current project I would like to teach.
- With 31 students and exactly 31 computers there are usually problems and some students cannot complete the activity or even start it. 28/31 of my students have access at home.

Support and funding

- As I don't have a computer in my classroom, I find the scope and sequence computer technology plan proposed by the district a farse. Just another add-on without money or support.
- Budget cuts to technology support have diminished teachers' ability to deliver a coherent technology program. If it is a curriculum, it needs to be properly funded.
- Computer labs need to be funded properly.
- Need someone in the school as a "computer expert" to solve problems immediately as they occur.
- Computers are very frustrating to work with when class sizes are large. Very often (almost always) there are computers that do not work. With 20 computers for 30+ students, some students must always share or do other work.
- The province and district are totally irresponsible and non-supportive. Most labs are a waste of money because of lack of support and training.

Reliability of computers


- The one thing that limits what you teach in computer class is having computers that work reliably and having enough comuters for each student.
- Computer time is very frustrating in our lab as we have so many problems logging in!!! Over half my class cannot log in on a regular basis because of problems in the lab.
- In the past, when teaching computer skills to my class I have found it very frustrating (to the point of a big waste of time) due to technical difficulties with the computers in the lab!!
- Computers in our school are a night-mare.
- Wait time to solve problems in the lab are ridiculous (cupe-worker)
- I find computers very frustrating. We don't have enough for every student, and they NEVER are all working at the same time. What do you do with those kids who don't have a computer or theirs isn't working? Our lab is too small to partner up.
"UGHHH!"
- Equipment is archaic and often broken.

Appendix F

Lab Administrator Interview Questions

Demographics

1. How long have you been a lab administrator?
2. How long have you been teaching? (Check the one that applies to you)
 - 0-5 years
 - 6-10 years
 - 11-15 years
 - 16-20 years
 - 21 + years
3. What would you say is your comfort level on a computer? (Draw a line crossing the existing line of your comfort level)



Not comfortable Very comfortable

4. What are the grade levels of the students you work with?

Impact and potential of computers in the classroom

5. Do you feel that there should be a stand-alone curriculum established for technology at the elementary grade levels? Yes or No
If yes – Should the curriculum be a province wide or district wide
Explain:
6. What impact have computers had on your teaching?
7. What impact has the computers had on the students?
8. What are the benefits to integrating computers with your program?
9. What would you like to see happen with the technology program?
10. How do you integrate computers within your classroom?

11. How would you like to learn more about computers? If workshops, what workshops would you like to attend and what would you like to see in them?
12. Are there any barriers for teachers as to using computers in the school? What are they?
13. Are there activities that you would like to do but cannot? Why?
14. Anything else you would like to include.

Lab Administrator Interview Questions (with Responses)

Demographics

1. How long have you been a lab administrator?

2-3 years

3
4

10+ years

2. How long have you been teaching? (Check the one that applies to you)

0-5 years

0
1
0
1
5

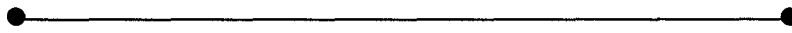
6-10 years

11-15 years

16-20 years

21 + years

3. What would you say is your comfort level on a computer? (Draw a line crossing the existing line of your comfort level)



Lab administrator responses (5.4, 6.3, 6.8, 6.9, 10, 10, 10)

Not comfortable

Very comfortable

4. What are the grade levels of the students you work with?

Grades 4-5

1
1
3
1
1

Grades 4-6

Grades 4-7

Grade 5

Grades 6-7

Impact and potential of computers in the classroom

5. Do you feel that there should be a stand-alone curriculum established for technology at the elementary grade levels? Yes or No

If yes – Should the curriculum be a province wide or district wide

Explain:

4 Lab Administrators said yes

2 Lab Administrators said no

1 Lab Administrators said yes and no

Comments

- **Yes**, there was an IRP 1995 for technology although it was de-listed about 3 years ago and set as a resource guide
- There is an expectation that there be a basic level of literacy among teachers
- It was costly as the tools are needed, teachers found it too difficult because of the skill levels of most teachers and there was a move to integration of technology into all the other subjects
- Province wide because there needs to be a base level of literacy among teachers and if there is a provincial wide set of expectations then teachers will get that base level of education
- Districts tend to look at the level of technology comfortableness across the province and there is an inequity within the district as some districts tend to put more focus on technology than others

- **Yes**, there should be a curriculum at the provincial level for elementary and secondary
- A curriculum would be the only way to standardize the program. There could be a separate curriculum at the district level to fine tune it but there needs to be more direction from the provincial government and better support and direction on how to teach the technology program better.

- **Yes** – but that would be putting schools at a disadvantage – as technology and software products are not available in all school
- Board would need to have a technology advisor (director) as the support is not currently available.
- We need the technology available and running regularly in order to run a technology curriculum
- It is very frustrating to not have the technology and to not have it running properly
- It there is one set of standards for all schools – then all schools should have access to the same or similar equipment and software

- **Yes**, Province wide as there would be a minimum set of expectations for each grade level with a gradual age appropriate increase.
- Province wide would be mandated with support.
- Teachers need to have the minimum standard.
- There needs to be one specialist in every school.

- **Yes and No**, it would not be a bad idea but technology does not stand alone it has to be integrated into other subjects as it has to have meaning and make it relevant to the students.
- There needs goals and objectives but in order to meet those goals they have to be integrated into the other subjects not taught in isolation.
- Province wide for consistency within districts as we have students who move from one district to another so that they meet the objectives.

- **No**, it should be that we integrate technology into the existing curriculum
- There should be a matrix of skills for each grade level. This matrix would be a guideline for what teachers should teach at that grade level
- The existing curriculum should have a technology component, that is integrated not taught in isolation and the integration could be in context of a project

- **No**, I do not agree with a stand alone curriculum. Computers are a tool to help deliver the curriculum and should not be the curriculum. It is just one more subjects that we have to teach.
- The other problem with having a stand alone curriculum is that there is no set standard for computers as we have a variety of computers in each school and classroom.
- Another problem is that we have no one providing education from the province or the district. Having a stand alone curriculum would be dumping more work on teachers who are already overworked and overburdened and who do not have the skills and are not receiving training to get the skills.
- Schools may not have the programs to teach the specific skills that are set out in a curriculum. The teachers may not have the skills themselves to teach and there is no training, guidance, or support for teachers to develop the skills.
- There are different levels of expertise, interests, software, and hardware. If we are going to come up with a stand alone curriculum then we also need come up with standards for computers, and computer service to use these computers. The teachers will start to feel guilty because they are not teaching a particular thing because the computers have been down for 6 months, or they are not interested in technology or there is no software available to teach the programs. If there was to be a standard curriculum then the ministries has a responsibility to maintain the standard instead of just dumping it on the teachers.
- People have different levels of comfort, experience and demands on their time.
- The problem with a curriculum is that people will get together to develop the curriculum and throw in everything, argue over it and throw out some things but not enough then it will arrive on a teacher's desk and then teachers will be expected to teach it.
- The current information technology resource document has too many learning outcome now that cannot be covered.
- There is no guidance from the ministry, the district or anywhere. A stand alone curriculum will never work, in practical purposes, because there needs to be a standard computer. Telling someone to cut and paste who does not have the skills themselves will not work and they will get frustrated. Teachers who can do it will

and those who cannot won't. Until the ministry and the district support teachers and computers, it is crazy. The thrust should be on how to use computers to accomplish these skills. The skills should be on higher level learning not on basic skills such as keyboarding.

6. What impact have computers had on your teaching?

Materials, resources and lessons on Internet

- A teaching level change so had no resources, no materials and no lesson plans, but found everything on the web
- There was rich teaching resources, current resources and information, interesting lessons for teachers and students
- I can create slide shows about topics.
- Ease of retrieving and making lesson plans
- Huge impact on Libraries as funding cuts have not allowed for the purchase of books so Librarians are turning to the internet.
- Good source for research but not everything on the internet is reliable.
- My students can research topics and then we can make displays with that information.
- Access to current information on the internet or use the old texts that have sometimes been written 10-20 years ago

Computer Project Based Activities

- Projects will be technology based. They could be either PowerPoint or web pages instead of paper pencil
- Use a number of web based, Web Quests, for all science and some socials programs due to the lack of resources
- Use Web Quests with the students
- A number of teachers are only using computers for word processing, typing, games, and drill and practice activities.
- Exercises or projects can use a combination of books and computers and compare which is easier.
- Before presenting something, I will often do a search on the web to find out more information.
- We now have an online web catalogue of books in place of the card catalogue.

Assessment

- Assessment is easy with access to a laptop for recording marks, palm pilot for on the spot assessment, and bring information into the grade book. It is done electronic and it is very easy to write report cards
- I keep marks on excel and record homework checks.

Communication with colleagues, parents, and students

- Communication with colleagues all over the world who have interests in the same areas, collaborations with other school on projects, email buddies, and country exchanges

- I communicate with parents and evaluate students. If the computer is down, I find that it is extra work to collect and record marks on paper.
- Everyone needs email skills as it is criminal for teachers not to use or refuse to use email. Email should be the minimum as all staff need to check their email every morning as principal memos, meetings, and other information can all be passed along by using email. Email saves paper and increases knowledge by signing up for list serves that promote educational development. List serves opens up your eyes to educational issues and allow you to find out what is going on in other countries so you can stay on top of educational issues.
- I can email parents and students with notes, homework assignments, and permission slips.

Use it as often as possible

- Incredible amount as our school has 2 scheduled classes but we leave open an hour block each day for classes to have access to do a project. This extra time is being put to use with Project based activities
- Important for extra use of computer time

Cannot ignore computers anymore

- You cannot ignore computers they have to be taken into account and you almost do not have a choice anymore. They have to be used.

Teaching styles

- Some teachers have been teaching a certain way for many years and computers have not been a part of their teaching before and will not be a part of it now.
- Enormous, I have changed the way I teach and the way I think about teaching.
- I have difficulty teaching when the computer is down now.
- I use computers as an instructional tool that makes teaching faster, better, easier and at a higher level.
- Computers have had an enormous impact on my teaching because I have an interest, expertise, and I taught myself.
- Students need skills on how to search, evaluate sites, pertinent, cite sources, ethical use of information, copyright, and plagiarism.

Other tools

- Use of the digital projector.
- I save paper, time, and transparencies.

Problems

- They make me frustrated because I would like to be able to rely on them more but it is not there. It is too hard to get the support into the schools. We have many computers out there but they are not being used to the potential because there are so many frustrating factors.
- Complicated and frustrating when the technology fails to work – when it does fail, it fails in a big way

- Technology is changing so fast that you need to adapt and it is mentally tiring to always be adapting.

7. *What impact has the computers had on the students?*

Authentic learning

- Most kids probably have a computer in their home although not all maybe 60-70%.
- Computers have had an impact on everyone's lives
- Older intermediate students, who have grown up with technology as they have it in their homes so to have technology in a classroom makes the learning more authentic when it is used
- Technology in the classroom allows students to learn the way that they learn at home. Gives them the experience of what they do at home they now do at school. This is different from 5-10 years ago when the learning was all being done in the classroom now this technology is also in their homes
- The students have so much more confidence than the teachers so they are more natural around them as they have always had them.
- The impact on teachers is often intimidation whereas on students, they are more natural with them as they have always had them.

Draft on computer and edit tools

- Students draft work on the computer in the classroom, they spell check and edit on the computer and this allows them to work the way they do at home

Differentiate the curriculum to meet the needs of students

- Allows for the ability to differentiate the curriculum, allows students to work independently and progress at different rates and this allows for enrichment with students

Skill level of students

- Students are comfortable on the computer but are not very computer literate
- Students generally can turn it on, use email, play online games, play music, chat room but do not know how to use it to empower their learning
- The students will take learning computers more seriously at school.
- They do not really know how to do a proper Internet search or even manage files on the computer that well.
- Even though technology has had a major impact on their lives, by the amount of time in front of it, education and teachers have a major role in teaching kids to use it as a productive tool
- Once it is introduced as a tool and not just as something to play with it becomes really powerful as the students enjoy it
- Kids love computers and they love to go on line to look up books and web information for resources.
- It no longer becomes a struggle to get work completed when using technology.

- Work comes in even from those students who usually do not hand work in. Those students will get something done when using technology.
- The kids sometimes think that the computer will answer everything. Students trust it too much and rely on it too much and will tend to waste too much time searching for a topic instead of using books. There is too much information and the students need to learn how to discriminate what is relevant and filter it and this needs to be taught to them.
- Some students think that they can Google their way to academic excellence which is not true.
- I think kids are having good exposure to computers in term of word processing skills.

Monitored

- Kids are not afraid of the computer and they modify the settings on the computer. Also, trying to keep them off the games and keep them on appropriate sites is hard to do. The students need to be monitored closely as the computers in school are for education not recreation.
- Data bases are excellent educational sources but we do not have the funding for them.

Potential for students depending on teacher skill

- Potential is huge but due to lack of knowledge of the classroom teacher and the need for training as there is a huge discrepancy between one teacher's skills and another.
- It depends on who is teaching so anywhere from huge to none.
- Some students know more than the teacher and have better computers at home than at school. The students come to school and they are held back because they play Number Munchers on them instead of higher level learning.
- Across Nanaimo, the impact that computers have had on students is negligible. In my mind, the computers are a waste of money only because they are not supported.
- Computers are invaluable but they are not valued.

Problems

- When computers are running, students have access to current and relevant information
- Made the world a smaller place – this has good and bad implication
- Increase the gossip – using of MSN out of school in inappropriate ways that therefore impacts the students when they come back to school the next day
- “MSN Type” is affecting the way students write (lol, u, brb, wuz, cuz...)

8. *What are the benefits to integrating computers with your program?*

Lack of resources

- Freshness of information an example is the atlases are old and do not have the current geographical and cultural information. The web allows access to accurate geographical and cultural information in seconds.
- Support material for science such as dissections and the microscopic world are available to the students on the web
- Students are able to use web based resources
- Allows for resources that are relevant, recent, and up to date.

Differentiate the curriculum

- Allowing for the ability to differentiate the curriculum and meeting the needs of the kids.
- Integrating computers with the program also gives the kids the opportunities for self direction and independence in their learning as well as taking the stress off the teacher as the learning becomes more authentic
- Increased student learning
- Individualized practice for students on a specific area that the student may need such as word recognition, math skills and practice on a one-on-one basis
- Easier for some students to type than to print/write their own work
- Reading programs – software that will scan and read information to the students that are unable to read and do not have teacher or Educational Assistant to be present at all times
- Work independently; at their own pace

Colleague collaboration

- On-line collaboration for both teachers and students

Motivation

- Motivational tool for students
- Computers are an important part of our lives and it is a natural thing to do to integrate them as they are everywhere and everything involves computer so we cannot put our heads in the sand.
- Kids love it. They think they are playing. It is motivational because the students do not realize they are working.

Computer use

- The more involved you become with computers the more you will use it. It comes with practice and using it.
- The trap is that people use it as a game instead of a tool. It is entertainment as well as a tool.
- Computers are a tool to enhance education. Computers are not the be all and end all. They are just another tool.
- Greater access to knowledge for the students and becoming familiar with how to use the computer improves their abilities.

- Electronic penpals with other students all over the world.
- There has been an enormous benefit because a teacher can do things at a higher level and faster. Teachers can teach things that they could not before.
- The key word is integrating. I spend very little time teaching computers but I integrate activities by using computers into what the students are doing.
- Word Processing programs make projects different
- Typing programs

Problems

- The current system has to be adapted to use the computer. The problem with this is that the teachers are already stressed to the max. They don't have the time because of classroom composition, Individualized Education Plan, and other requirements, so the thought of learning how to integrate computers is just too much. Also teachers may have been successful for many years without computers and some don't see the need for them now.
- Technology is out there for computer assisted writing/reading programs. The problem is how to integrate it into your regular program.
- Need to become acquainted with a computer program, as one workshop is not enough time and exposure to get to know a program.
- It is hard to fit in the time to learn a program at school.
- There are huge benefits to computers in the schools, if there is time to get to know the program.

9. What would you like to see happen with the technology program?

Resource Person

- District resource person, as the use of technology has dropped off since the end of the resource position
- School based leadership as there is a continued need for leadership support in the schools
- Total revamp of the system – done from the perspective of a teacher that works within the system – not a person who is trying to think like a teacher but someone actually doing the teaching
- Collaboration between the technology person and the classroom teacher working together. The evaluation and the instruction is in partnership and everyone learns how to use the technology by working together.
- More accessibility for teachers to use computers – a place for teachers to work and get support within the school – not in the lab where there are classes going on
- I would like to see a set amount of time for technician to be available at every school site each week.
- The technician also needs the freedom to go where they are needed still allowing for contact with the school lab administrator to talk one on one every 1-2 weeks.
- More access to IS person in the district

Value of technology in the classroom

- For the district to see the value of technology in the classroom
- I would like to see the technology program supported, the computer valued, the technicians valued and provided and the software valued and provided.

Educator Driven

- The technology program should be driven by educators and decisions based around an educational focus rather than technical focus
- The rules put in place hinder what teachers can and cannot do.

What students need?

- Important part of the technology should be around what the students need not around what will keep the administration of the system. The educational purpose and the learning that can be involved around it is the most important part.
- Realize that the security and help of the network is important but not as important as the education of the students and sometimes we need to take a few more risks so that we can meet the educational needs of the students

Integrated learning outcomes

- A set of learning outcomes for technology that teachers follow which are integrated into the current curriculum
- Going back to some sort of guidelines that come from the ministry that state what exactly we should consider to be part of the technology program. What we should be doing? What are our goals? What criteria are we trying to establish in order to integrate technology into our classroom?
- There is a need for a more concrete set of guidelines as there is very little consistency from one class to the next.
- The other thing is that technology changes so fast that when trying to set the goals and objectives they may not be relevant six months from now or they may be altered.
- Concrete guidelines are needed that are divided by level. How much has to be covered at this grade level?
- I would like to see the Scope and Sequence draft completed.
- There are two parts to the technology program which are the user part and the implementation part. The District or Ministry level should outline how many students per computer in the school, how much money will be allocated to maintain them and how much access to data bases and software there will be so that would be the administrative function. The point of use of the user requires a scope and sequence from k-7 for either the classroom teacher who has training to deliver the curriculum or a technology expert who works with the teacher. There needs to be training for the teachers to learn how to work with the teacher.

Funding

- More money for technology
- Technology program should be 1/3 software, 1/3 hardware, and 1/3 training.

Problems

- “What technology program?”

Training

- Training for teachers – in-service
- Release time – not professional development days as this is not enough time

Suggestions

- Taking out labs and putting 5 to 6 in the classrooms
- Wireless labs that can be moved from classroom to classroom on a sign out basis

10. *How do you integrate computers within your classroom?*

Part of the classroom

- It is a part of the classroom. How do I integrate the chalkboard or textbooks? It is there to be used.
- As we are working and discussing a student will get up and go to the computer where they will find information about the topic come back and be able to contribute to the discussion
- It is a resource for them to use to find information
- They still play games as it is their entertainment also
- The students have also bought into the fact that it is a tool for learning
- It is part of the room, like a desk, chair, board, text.

Project based activities

- Technology based projects
- Science and socials units created through the use the web based units
- Web quest are used with the students.
- I create Language arts activities for the computer.
- Assignments for typing, research, novel studies, web quests – when computers are running to have access to the technology

Internet

- Internet access in schools
- Research by using the library resources and the web and to compare information. To look at the value of the information from both sources.
- Teach the students to find library resources and information by using webcat and internet searches
- Web pages and the skills involved to build them.

Word Processing

- Word Processing skills with the project done in class and typed into the computer.
- Word processing, cutting and pasting, printing, importing pictures, using charts and graphs
- Word processing and story writing but would like to have more opportunity to use the computer for specific learning for students.

Educational games

- Primary classes use it for education games.

Touch Typing

- Touch typing program

PowerPoint

- Power Point
- I create PowerPoint presentations.
- PowerPoint

Mandated set of goals

- There should be a mandated set of goals that are taught. Technology should be a part of the curriculum not just integrated on the whim of the teacher.

Video Projector

- A Video projector is essential in every class when a teachable moment comes up, the students or I can do an internet search and then project it onto a screen so everyone can see.

Skills teaching

- Skill practice for students

Working computers

- A minimum of one working computer in each classroom and one working computer per student in the computer lab.
- Four computers in learning assistance room not all working with lab access but somewhat restricting because some of the programs for certain classes need specific programs. There is no need for site license but a need for individual license and these programs need to be installed on specific computer.
- Specific education class – resources

11. How would you like to learn more about computers? If workshops, what workshops would you like to attend and what would you like to see in them?

How to use technology in the future classroom

- My interest in technology workshops would be around the vision or the classrooms of the future and how to best use technology in the classroom.
- The whole concept of integrating computer into the classroom would be a topic on its own.
- Workshops that have an educational focus.

Communication with other colleagues

- Teachers have given up but the value of communication with other colleagues could be a valuable tool.
- Network working by being a member of CUE BC or joining the new local division in Nanaimo. This organization is a network of people in education that discuss computer education issues

Workshops

- Workshops
- There are two types of workshops which are important. These workshops are the application or how to use the programs and integration or how to integrate technology into your current program
- Other workshops to increase skills and confidence
- Workshops need to be at point of need. They need to be useful for the teachers and able to use immediately. They cannot be presented in isolation.
- Packaged workshops such as “Here is a project to do on (topic) for grade (number) in (subject)”. This would be a prepackaged ready you use activity.
- Animation, web quests, web pages, basics
- Integration of science
- Creating and maintaining webpages
- PowerPoint
- Excel and spreadsheets
- Word Processing
- Kid Pix
- Specific programs such as digital imaging, PowerPoint and web site building
- PenPals
- Workshops such as PowerPoint, Email, Excel, Word, and Internet search.

Support for teachers

- At the district level, the need for basic support for teachers. A hook that we have is the district email so a blitz on email would help. Once a teacher learns at a personal level, they will see the value of it at the professional level. It is easy to teach and it would spur on some teachers to take technology to another step.
- Director of Technology to show how programs work
- .2 support for lab – computer person who is qualified to demonstrate programs and give suggestions for integration
- Classroom teachers need to be educated by having computer teachers take a class and show the classroom teacher how to use the program. They would show the classroom teacher how to use a program and how to trouble shoot in a practical real life setting.
- I think you have to have someone teach the teacher just the skills and then have someone in the class to teach the teacher how to use those skills. Someone needs to model the skills and mentor teachers enabling them to use the technology.
- Multiple level workshops that teach the skill, has a follow up session to teach the trouble shooting and then bush up sessions.

Practical Time

- Attend workshops but also to have practical time to use the program. It would be nice to have access to the software to take home for a few months to explore the options and practice the skills.
- Giving workshops also helps to learn more about the specific program because you get a deeper understanding of that program

How

- During school day – not professional development days
- Professional development days
- Release time that is during school day
- Release time to attend workshops during the day as after school I am very tired and it is hard to assimilate the information

12. *Are there any barriers for teachers as to using computers in the school? What are they?*

- The barriers are everything such as money, training, interest, education, and knowing how to integrate computers.
- Yes, there are many barriers such as the lack of timely support; the lack of adequate or reasonably priced software; and the lack of experience and willingness on the teacher's part to integrate computers into their classroom.

Access to the computers

- Access to the technology
- Not every teacher has an online working computer in their classroom. Every teacher should have a working computer in the classroom as it has to be convenient for the teacher to access. Ideally, the teacher should also have one on their desk to have easy access to as it would be used more if it was ready to be used instead of having to wait to load it. It would have to be convenient because the teacher would use the excuse that it was not convenient for them to use.

Technical Support

- Access to the technical support and how long does it take to get it back up and running. If a teacher starts to rely on the technology and it keeps breaking down then they wouldn't use it.
- We do not have consistent help to gets computers fixed.

Support for teachers

- No provincial guidelines or support
- Support not just when the technology is not working and needs to be fixed but when a teachers needs to know how to do something or the most effective way to do something
- More access to workshops with more space available for all to learn
- More release time and how to better utilize

- A group of experts (master teachers in area of technology) to get release time to go into schools for a day or two. They would go into classes and demonstrate how teachers can better utilize the computer
- Teacher training needs to focus on training with the computer.
- The focus for this job is on the technical aspect and my expertise has increased in this area but that was one barrier for me.
- The training needs to be in really small increments and point of need. Whatever teachers learn needs to be practiced immediately then learn something new and again practice by using knowledge in the classroom. Too much is overwhelming and if not used you will lose the knowledge and skill.
- Lack of computer support for teachers
- Not enough resources

Funding

- Comes down to money and resources as the biggest barrier
- 30% of money for technology should be spent on training.
- Not enough money for running computers, software, printers and other technology

Teachers Literacy

- Literacy of teachers as when a teacher is not comfortable with technology they will be reluctant to teach it. There are ways to get around this though by using a buddy system or team teaching
- Teachers have lots of other things to do so the comfort and interest level of the teacher will spark
- Number one is fear of technology coming from an aging workforce and not having grown up with the technology around it is therefore not natural for some
- Teachers are becoming more comfortable but not where they should be to be teaching computers
- Using email more in schools. It will be difficult for some to learn as they are not as comfortable and are reluctant because they may not have a computer at home. The email will be for sending information within the school system.
- The barriers are often their own lack of confidence in using the technology.
- Older experienced teachers are not as comfortable with technology as the younger new teachers coming into teacher. Newer teachers are more open and flexible when using computers.
- People have technophobia around computers. Those people think that learning about technology has passed them by. They see others doing tasks with computers and do not realize that the other person is probably not that far ahead, it is just that the other person has actually put their foot in the water and attempted to learn. Teachers need to actually make the attempt.
- Teachers who are not computer literate are not seeing the application as they lack of knowledge about how to use.
- There is a lack of time to learn, and a lack of people to train teachers. Teachers are just really really busy and this is just one more thing.

- Some teachers may be a little intimidated and may have problems with some of the students knowing more than they do.
 - Most teachers think of computers as add-on not as an integrated tool. They say 'I don't have time for computers today' whereas I say 'how am I going to get my language arts done without the computer'.
- Older generation – not willing to learn or not comfortable about learning computers

13. Are there activities that you would like to do but cannot? Why?

- No, because of my comfort level on the computer. If there is something I want to do, I have enough technical knowledge and will find a solution.

Conferencing

- Generally speaking, I think there is a great need for conferencing with colleagues to have discussions about single subjects or interests but there is no facility for teachers to do this within the district.

Website

- Build my own websites but don't have the time to learn and build one.

Software

- Kid Pix but did not use it after the training and do not remember how to use it.
- Adobe Acrobat does not work on Windows 95 so the operating system needs upgrading.
- PowerPoint or other multimedia programs – no software available in school
- Video editing with kids, as it is a very empowering tool as multimedia is a big part of presentation and a big part of what students are about. A lack of resources and/or funds to purchase the equipment such as video recorder, hardware, software are the reason for unable to do this
- More with photographs have done some but the lack of resources hinders it
- Animation and video editing but schools need software, equipment, and training.

Reason why

- Lack of funding for software and resources
- Also see comment under video editing
- Create projects such as Year Books but do not have the technology or the knowledge to create one.
- Time, access to trainer or help, access to software are all reasons for why I cannot do the activities.
- Programs not installed but available in the school waiting for installation.
- Scanner not working and waiting to be installed.
- Computer crashed and still waiting to get software installed on the replacement computer.
- Would like to be able to add own software without technician on a couple of computers when the software is needed.

- Independent Math Programs – to support enrichment or adjusted programs – not enough time in lab, support to teach and run program or money to purchase program

Lab Administrator Training

- I would like to get more training as a Lab administrator but there is not enough time or adequate training.

Release time

- I would like to spend more time with the students and release time to work with students and teachers. This would not be to give prep time for the teachers but to work with the teachers and teach them also.

Time to use it

- You have to keep using the technology or you will loose the knowledge.

Technology

- Projector to support learning and view projects – no funds available to purchase
- Scanner have used one but don't remember how as it has been a while.
- Colour Printers to display art work and other colour projects – not funds available to purchase
- Mini Lab in Classroom – not enough money to purchase computers or software

Solutions

- There are solutions but sometimes there are roadblocks put up but if a teacher can defend the reason for doing something for the educational value of it then the people putting up the roadblocks cannot argue about it and it gets done.

14. Anything else you would like to include.

Technology Literacy

- There is a steady decline of technology literacy as the skill set has gone backwards. There are many reasons for this decline within this district. The reasons are the direction the district has gone, lack of money, politics and teachers have abdicated the responsibility to others.
- Teachers seem more comfortable with computers but the literacy level has declined. Literacy is the understanding of how it works and why and at the moment there is only one University in the Province that requires teachers to take a technology course.

Resources

- With the lack of resources, a teacher is required to be creative with what can be done
- Software purchased, when technology came in, is not being utilized as much
- Programs being used are the office package, internet for research, publisher
- There is a need to be resourceful by using what is available

Training

- More training for administrators for technical by the technicians and for applications by teacher who have the skills
- Lab Administrators position has increased my confidence level on the computer.
- A fair amount of support is needed to help those teachers who do not have the confidence in computers.

Technical support

- The time you wait for having programs/software installed to the computers or fixing problems is sometimes a long time. We need more tech support, and quicker service.
- Technicians are overworked and they are not educators so they do not understand what the education system needs or wants.
- If something goes wrong with a computer, you should be able to get it fixed within a day.
- Computers need support and I am surprised that they get used as much as they actually do.
- Fair share of technicians' time with high schools.
- Computer lab down for long periods of time
- No one available to do computer repairs since December

Teacher needs

- There is no chain of command.
- There needs to be someone on staff who knows computers in each school.
- Every classroom should have a multimedia projector, video camera/device, and a computer dedicated strictly for the teacher.
- Every school support teacher with laptop to record information and be more efficient in their use of time for recording notes for meetings.

Other:

- Total out right crime what has gone on with computers in the province.
- People at the top talk about computers but nothing is provided
- Technology is changing so fast
- Money needs to be spread out throughout all school in the district not just some
- Most students don't come to school to use computers as they have them at home

Appendix G

Tables and Figures

Table 1

Teachers not interested in attending workshops compared to their grade level, years of experience and the comfort level teaching and using computers

Teacher	Grade Level	Years of teaching experience			Comfort level	
		11 to 15	16 to 20	21 +	teaching computers	using computers
1	5 & 6	1			1.6	4.3
2	7	1			2.1	4.3
3	7	1			9.8	6.9
4	4 & 5		1		1.3	5.6
5	6		1		5	7.1
6	4 & 5			1	0	5.2
7	4			1	0.4	3.2
8	4			1	1.1	1.8
9	7			1	3.7	6.4
10	5			1	4.4	4.9
11	7			1	5.8	5.3
12	6 & 7			1	8.2	8.3
13	3 & 4			1	8.3	6.7
14	6 & 7			1	10	8.9

Table 4

Programs (applications) used by the percent of teacher per grade level		Grade 3/4	Grade 4	Grade 4/5	Grade 5	Grade 5/6	Grade 6	Grade 6/7	Grade 7	Overall total
Number of teachers who teach at grade level		5	13	6	4	6	4	9	8	55
Total percentage of teachers who responded to the questionnaire		100	100	100	100	100	100	100	100	100
Word Processing		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Internet		100.0	100.0	83.3	100.0	100.0	100.0	100.0	100.0	98.2
Typing		100.0	84.6	83.3	75.0	100.0	100.0	66.7	87.5	85.5
Instructional games		100.0	92.3	50.0	100.0	50.0	75.0	33.3	50.0	67.3
Drawing and Painting		40.0	30.8	16.7	50.0	33.3	25.0	66.7	12.5	34.5
PowerPoint		20.0	15.4	33.3	50.0	16.7	50.0	44.4	37.5	30.9
Email		40.0	15.4	16.7	75.0	33.3	0.0	22.2	37.5	27.3
Spreadsheet		20.0	7.7	33.3	50.0	0.0	25.0	33.3	25.0	21.8
Web Building		20.0	7.7	16.7	25.0	0.0	0.0	55.6	25.0	20.0
ACDSee		0.0	15.4	0.0	0.0	16.7	0.0	11.1	12.5	9.1
Database		20.0	0.0	16.7	0.0	0.0	0.0	11.1	12.5	7.3
Other		0.0	0.0	0.0	25.0	0.0	0.0	0.0	0.0	1.8

Figure 7. The number of teachers who responded compared to the teachers' comfort level with using and teaching computers.

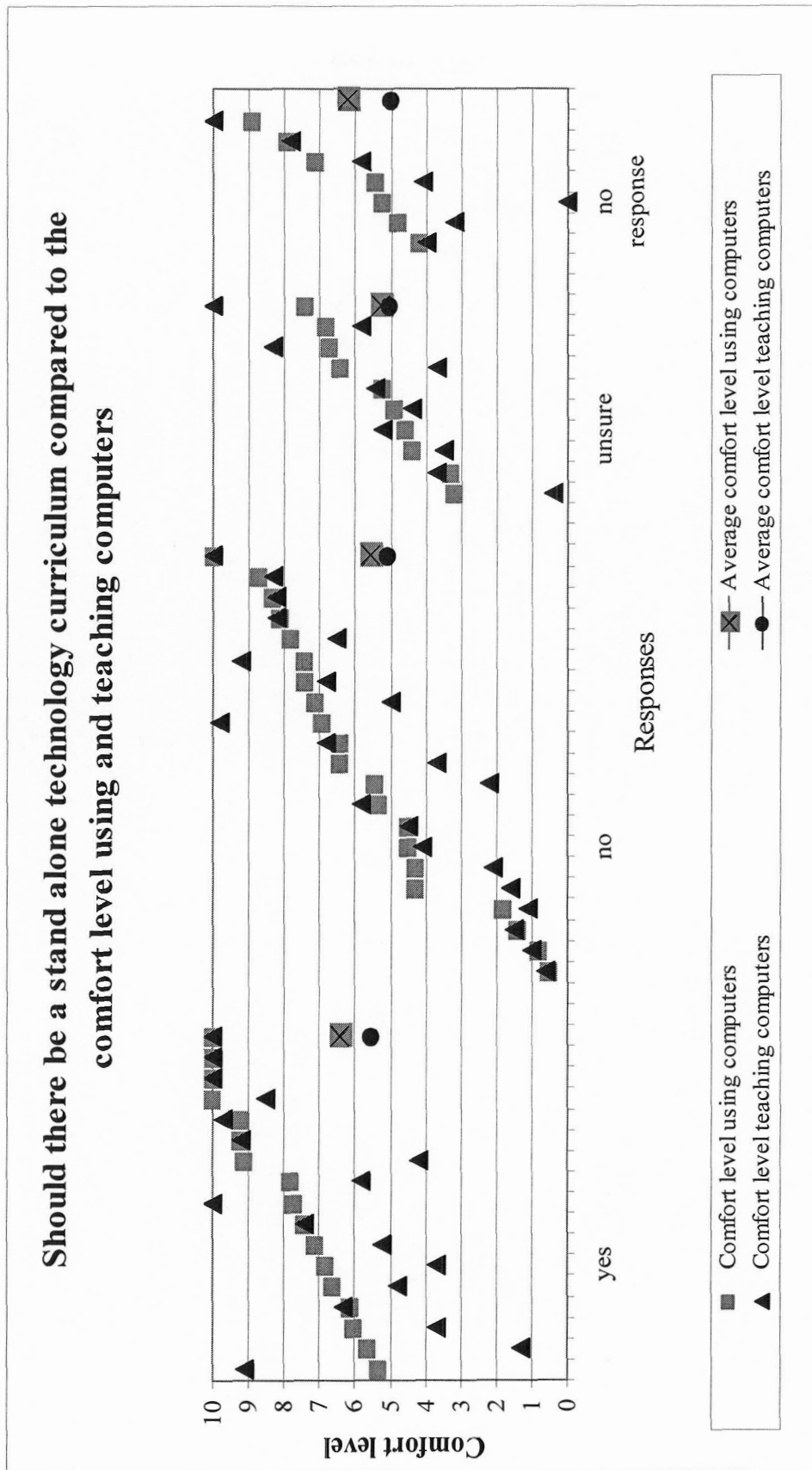


Table 8

Word Processing skills taught by the percent of teachers per each grade level

	Grade 3/4	Grade 4	Grade 4/5	Grade 5	Grade 5/6	Grade 6	Grade 6/7	Grade 7	Grade 8	Overall Total
Total number of teachers who teach at grade level	5	13	6	4	6	4	9	8	55	
Total percentage of teachers who responded to the question	100	100	100	100	100	100	89	100	98	
Ask students to type in project only	60	69	50	75	50	75	67	38	60	
Ask students to type in project then manipulate it	60	69	50	75	50	75	56	88	65	
File management - save, save as, print, open, close, new	100	100	83	100	100	100	78	100	95	
Edit: cut copy and paste, delete and insert, undo and redo	60	85	83	100	100	75	78	100	85	
Edit: change font, size, style and colour of text, bold and italics	60	85	83	100	100	100	78	100	87	
Edit: Alignment	40	38	17	75	83	0	67	75	51	
Edit: Spelling and grammar	80	85	83	100	100	75	78	100	87	
Selecting Text	80	23	50	75	83	25	67	88	58	
Changing margins	20	8	33	50	50	0	56	88	38	
Find and replace	20	8	50	25	33	0	44	38	27	
Create a document using tables	20	15	50	25	17	50	44	63	35	
Create a document using columns	20	8	50	25	50	25	56	63	36	
Add and manipulate graphics in a document	60	31	67	75	50	75	67	63	56	
Other	0	0	0	0	0	0	0	0	0	

Table 9

Internet skills taught by the percent of teachers per grade level

	Grade 3/4	Grade 4	Grade 4/5	Grade 5	Grade 5/6	Grade 6	Grade 6/7	Grade 7	Overall total
Total number of teachers who teach at grade level	5	13	6	4	6	4	9	8	55
Total percentage of teachers who responded to the question	100	92	67	100	100	100	89	100	93
Launch browser to access the World Wide Web	100	77	67	75	100	100	78	100	85
Access information files and search sites	100	62	50	100	100	75	89	88	80
Use search engine for keyword searches	80	92	50	100	100	100	78	100	87
Use Boolean operators to narrow search criteria	0	8	0	50	0	0	11	38	13
Determine appropriate site skills	60	0	17	25	0	0	33	63	24
Add to favourites	40	54	17	75	50	25	33	63	45
Copy and paste images and materials to another file source	60	31	50	50	50	75	67	75	55
Save search results	20	15	17	50	100	0	33	75	38
Send and receive electronic mail	40	15	17	25	17	0	33	38	24
Observe appropriate etiquette at all times	80	54	33	100	33	50	44	75	56
Participate in collaborative projects	20	31	17	50	33	0	56	38	33
Print selected material	100	62	33	100	67	75	78	88	73
Explain copyright/plagiarism issues	60	23	33	75	83	75	78	100	62
Other	0	0	0	0	0	0	0	0	0

Table 10

Drawing and Painting skills taught by the percentage of teachers at each grade level

	Grade 3/4	Grade 4	Grade 4/5	Grade 5	Grade 5/6	Grade 6	Grade 6/7	Grade 7	Grade 8	Overall Total
Total number of teachers who teach at grade level	5	13	6	4	6	4	9	8	55	
Total percentage of teachers who responded to the question	80	46	33	50	33	50	67	38	49	
Create a line drawing	80	23	17	25	33	25	44	25	33	
Change line colour and width	80	31	17	25	33	25	44	25	35	
Create circles and boxes	80	31	17	25	33	25	56	25	36	
Create freehand drawing	80	38	17	50	33	25	56	13	38	
Use eraser and other tools to edit or create an image	80	38	17	50	33	25	56	13	38	
Resize and reposition images	80	23	17	50	33	50	44	38	38	
Flip, crop and rotate images	40	23	17	25	33	25	44	38	31	
Add text	60	31	17	25	33	25	56	13	33	
Import Clipart	20	23	33	25	33	25	56	38	33	
Add colour by filling shapes or background	80	31	17	50	33	50	44	25	38	
Add Texture to shapes and background	60	31	17	50	33	25	44	25	35	
Use other tools such as magnify and eyedropper	60	23	17	25	33	25	44	0	27	
Special effects such as spray brush	40	15	17	50	33	25	56	25	31	
Other	0	0	0	0	0	0	11	0	2	

Table 11

PowerPoint skills taught by the percentage of teachers per grade level

	Grade 3/4	Grade 4	Grade 4/5	Grade 5	Grade 5/6	Grade 6	Grade 6/7	Grade 7	Grade 8	Overall Total
Total number of teachers who teach at grade level	5	13	6	4	6	4	9	8	55	
Total percentage of teachers who responded to the question	0	15	50	25	17	25	44	38	27	
Navigate Documents	0	15	17	25	17	0	22	25	16	
Use correct terminology to describe techniques and tools	0	15	17	25	17	0	22	13	15	
Integrate different media into a single document	0	15	17	25	17	0	22	25	16	
Create a presentation or a document	0	15	33	25	17	25	33	38	24	
Use special effects	0	15	33	25	17	0	22	25	18	
Create basic animation and other visuals	0	8	33	25	17	0	11	13	13	
Create a simple slide show presentation	0	15	33	25	17	25	33	38	24	
Incorporate digital graphics	0	15	17	25	0	0	22	25	15	
Other	0	8	0	0	0	0	0	0	2	

Table 12

Spreadsheet skills taught by the percentage of teachers per grade level

	Grade 3/4	Grade 4	Grade 4/5	Grade 5	Grade 5/6	Grade 6	Grade 6/7	Grade 7	Grade 8	Overall Total
Total number of teachers who teach at grade level	5	13	6	4	6	4	9	8	8	55
Total percentage of teachers who responded to the question	20	8	50	50	0	25	22	25	25	22
Use spreadsheet terminology	0	8	33	50	0	0	22	25	25	16
Describe the purpose of a spreadsheet	20	8	33	50	0	0	22	25	25	18
Recognize the parts of a spreadsheet	20	8	33	50	0	0	22	25	25	18
Use an established spreadsheet to find information	20	0	17	50	0	0	22	25	25	15
Add data	20	8	33	50	0	25	22	25	25	20
Change fonts	20	0	33	50	0	0	11	25	25	15
Change column widths	20	0	17	50	0	25	22	25	25	16
Create own spreadsheet	20	0	33	50	0	25	22	25	25	18
Sort Data	0	0	17	25	0	0	22	25	25	11
Create a graph or chart	0	8	17	25	0	0	22	25	25	13
Incorporate spreadsheet information and charts into other documents	0	0	17	0	0	0	22	25	25	9
Create legends/ titles	0	0	17	25	0	0	22	25	25	11
Calculate values of cells	0	0	17	50	0	0	22	13	13	11
Write formulas	0	0	17	25	0	0	22	13	13	9
Other	0	0	0	0	0	0	0	0	0	0



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Appendix H

Human Research Ethics Board Certificate of Approval

<u>Principal Investigator</u> Ann-Marie Brayden Graduate Student	<u>Department/School</u> EDCD	<u>Supervisor</u> Leslee Francis-Pelton	
<u>Co-Investigator(s):</u>			
<u>Project Title:</u> An investigation of computer technology instruction in the elementary classroom			
<u>Protocol No.</u> 464-04	<u>Approval Date</u> 07-Dec-04	<u>Start Date</u> 07-Dec-04	<u>End Date</u> 06-Dec-07

Certification

This certifies that the UVic Human Research Ethics Board has examined this research protocol and concludes that, in all respects, the proposed research meets appropriate standards of ethics as outlined by the University of Victoria Research Regulations Involving Human Subjects.



Dr. Richard Keeler
Associate Vice-President, Research

This Certificate of Approval is valid for the above term provided there is no change in the procedures. Extensions or minor amendments may be granted upon receipt of a "Research Status" form.

464-04 Brayden, Ann-Marie