The Social Challenge of Laptops in the Learning Environment

Barbara Hunting

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ABSTRACT

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This case study is an exploration of the social challenges surrounding laptops in the learning environment. Student engagement, the use of the laptop and professional development are the major components of this study. The ethnographic design methods of interviewing and attendance at a laptop conference all informed this case study.

The Eastern Townships School Board began implementing a laptop project in the Fall of 2003, it is the largest laptop integration in Canada and will be in full operation by the Fall of 2005 when grades 3 - 11 will be using Apple iBook laptops. The new laptop program is known as the Dennis McCullough Enhanced Learning Strategy (Enhanced Learning Strategy). The sample population of this research consisted of grade 5, grade 11 students, and teachers in the elementary and high schools with varying teaching experiences.

The use of laptops in the classroom is a new field of research, with very little research data available from a Canadian perspective. In addition to adding to this body of work, the thesis discusses the challenge the teachers were facing when blending instructionist (passive learning) and constructionist (active learning) teaching practices.

Acknowledgements

I wish to acknowledge the time and effort that Dr. Fran Shaver put into the supervision of this research project. I also would like to acknowledge the support of my thesis committee, Dr. Anthony Synnott, and Dr. Roksana Nazneen, who helped guide me on the journey of this thesis project. I would be remiss if I did not acknowledge Dr. Sally Cole for helping me to see issues from another perspective.

Dedication

I dedicate this work to my family. My husband, Karl, who encouraged me throughout this journey. My daughter, Rachel, a sociologist, who knows this research as well as I do, her unending knowledge of writing skills have been an essential element in the fruition of this thesis. My son Benjamin, who let his Mom move in with him when most sons had moved away from their mothers. A thank you to C.C. a natural supervisor. A thank you to Prof. Caroline Viens, a friend, colleague, and a source of inspiration.

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CHAPTER ONE

Background Framework

Introduction

Laptops in the Learning Environment, seems simple enough. But it isn't and little is known about it. A review of the Literature for this exploratory case study revealed information connected to education and technology but next to nothing about laptops in education from a Canadian perspective.

The Enhanced Learning Strategy is not just a pretty title; it has developed an important signifance for this study. My interpretation is as follows: *Enhanced* refers to the ownership of the learning that takes place when a laptop is placed in the learning environment. *Learning* is aimed at both student and teacher, and *Strategy* is the Professional Development that can be experienced on a path to Lifelong learning.

The Background Framework demonstrates the interaction between the Learning Environment, the Knowledge Society, and the Quebec Education Curriculum. Student achievement coupled with new ways to interact with and produce data transform a classroom into a rich learning environment. Debate about the mandate of schools is also part of the exploration of this study. The Knowledge Society is a rapidly growing global political perspective that is an attractive supporter of technology within the Learning Environment. These components and a high drop out rate in the province of Quebec have helped to initialize a study that the Quebec provincial government undertook before the revision of the current curriculum.

This study looks at the laptops in the learning environment; I do not say classroom because having access to the internet broadens the limitations of the printed

text and the classroom. I welcome the reader to a study that will provide an enriched perspective about learning, technology, and a reformed curriculum.

The Learning Environment

A primary goal of the Learning Environment is student achievement but the Learning Environment is much more than the classroom. The major components are the school board, the principal, the teachers, the staff and the parents. The goal of any school system is to produce a viable graduate.

The Learning Environment is created by a will to learn. The Eastern Townships School Board (ETSB), states on their website that student achievement is one of their primary goals in the Enhanced Learning Strategy. The data production in this project leads me to see that teachers are struggling with a new tool, a new curriculum, and the concerns they have for the students' achievement. The laptop can be an excellent tool for a teacher to use as an electronic notebook with software that makes classroom management and evaluation less of a chore. However, curriculum changes take time and more research must be conducted. One of the objectives of this study is to add to the Canadian standpoint of data in this field about learning with laptops.

School reforms are not new in the field of education. Thus, in order to understand their development in the public school arena, I will briefly look at the origins of the public school system. Core areas of the curriculum in the public school system are and still are centered upon academic areas such as reading, writing, mathematics, languages, sciences, history and geography and subjects that focus on personal development such as physical education, health, drawing, music and dance. Social and political and economic goals are influential in the shaping of public schooling (Wotherspoon, 2004). The

Church also had a role in shaping the public school system by the embedding of monastic habits such as order, discipline and habit—even though these were part of the industrial work ethic they were also attributes of a socially and politically developed individual. In the 1800s the role of the school was to produce "morally regulated individuals" (Wotherspoon, 2004). "Such morality, however, was to be produced in the public realm, with adherence to the bourgeois state rather than to any particular religious denomination" (Wotherspoon, 2004: 172).

In the late 1860s, when child labour was an important part of the industrial labour force, school was viewed as a competing force to industrial employers. Since then there has been a tension between industry and schooling. This tension was produced because the public questioned whether school was to keep children off the streets or to be a training factory for the labour market. Consequently a debate developed about the mandate of schools:

> Carnoy and Levin (1985) point out that schools are driven by the contradictory dynamics of what they call a capitalist imperative and a democratic imperative. They contend that, 'On the one hand, schools have traditionally reproduced the unequal, hierarchical relations of the nuclear family and capitalist workplace; on the other, they have represented the expansion of economic opportunity for subordinate groups and the extension of basic human rights.' (cited in Wotherspoon, 2004: 172)

Part of the debate and discussion around the issue of what is to be taught in the public school is fueled by the workforce demands. Employers want disciplined and highly skilled workers and the working-class want to attain an education that will provide them with the ability to earn a decent living wage. Since the 1930s many surveys have been done to keep up with the demands on education.

One pattern that emerges in surveys of this nature is that job preparation
and training gain force as priorities in times of high unemployment and
uncertainty or transitions in labour markets (Wotherspoon, 2004:173).

Predictions of a future of unstable employment can transform individual thinking,

motivate improvement in employable skills, and keep people motivated to stay in school

longer. If schools are driven by a capitalist and democratic imperative, as Carnoy and

Levin (1985) put forth, then adaptability is a requirement. Michael Cox, a chief

economist for the Federal Reserve Bank has predicted the need for this flexibility:

.....predicted to a group of students that they would have at least five jobs
after they graduate, four of which haven't been invented yet.
(techlearning.com)

Wotherspoon (2004) looks at the social and economic issues of schooling. The

expectation of having one career during a person's life has changed in the last 30 years.

Anisef and Axelrod (1993), describe a process of transition(s) that occur during an

individuals' career path, much in the same way that the teacher is constantly learning

through Professional Development (cited in Wotherspoon, 2004).

A conceptual question in the field of education is "What do students really need to

be learning today in order to be ready for an unpredictable future?" (techlearning.com)

Livingstone argues that adaptability is the key to success and that 'lifelong learning' has

become the norm that will govern our educational futures (Livingstone, 1999:14-15 cited

in Wotherspoon). To finalize this lifelong learning component Wotherspoon (2004)

draws a correlation between people with higher educational credentials and the

achievement of a more successful and meaningful work life. Wotherspoon (2004)

indicates that in times of a transitional economy that education is linked to social class

concerns.

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Within this economic uncertainty an emphasis is placed on a "skills discourse" in 1994, a Canadian study was performed to understand the skills that were used in jobs requiring a high-school certification or less (Taylor, 2003: 293). The study looked at the skills of reading, using documents, math, problem-solving, decision-making and computer skills (Taylor, 2003).

There are opposing viewpoints in the education sector about the integration of economic activity in the classroom.

> Many corporations introduce curricular materials or sponsor school teams
> and events, such as essay-writing competitions, that may produce a
> favourable climate or corporate image at the same time as potential
> recruits or ideas are being harnessed for corporate objectives (Apple,
> 1993: 119-20; Regnier and MacLean, 1987 in Wotherspoon, 2004).

Since education boards battle financial cutbacks, corporations and computer companies are attractive alternatives even though there is a risk of capitalist influence. There is a great deal of contradiction in the literature about the power transnational corporations hold, in relation to the government. Researchers note this contradiction and warn about the power of employers and how the government should listen to interest groups noting issues of equity. Educators, parents, and other concerned citizens need to challenge neo-liberal approaches to education reform that more firmly entrench the primacy of markets in education—or, at the very least, demand that markets be regulated to ensure that equity concerns are not ignored completely (Taylor, 2003: 312).

In order to assure competitiveness in the global market, policy-makers argued "that a high-school diploma must become a more relevant credential for the new economy..."(Taylor, 2003: 293). "A more relevant credential" is only one side of the coin. A neo-liberal capitalist system reinforces subordination, inequality, and

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indifferences (Murphy 1988, cited in Taylor, 2003). It is vital to challenge these divisive

systemic concepts of inequality and create an awareness and develop strategies to

challenge current and future educational policies.

Davis (2000) is also critical of the skills discourse and notes that an education

could be re-categorized to vocational training (cited in Taylor, 2003). This is in effect a

current event, students are streamed into courses that promote further education (post

secondary) or vocational (trade) education. With the combination of technology and

curriculum Taylor reflects that students master problem-solving and communication

skills that are essential in the knowledge economy.

Taylor's term 'skills discourse' is the modern day version of technological

functionalism, part of the structural functionalist analysis, that the school's mandate

match the demand of technologically skilled workers in an industrial society.

Furthermore, these everchanging shifts in educational requirements have been part of the

rhetoric for the last 25 years (Collins cited in Taylor, 2003). The technological

functionalist perspective represents the global market influence on the present transitions

taking place in the public school system.

Funding pursued by dedicated professionals is an administrative challenge of any

technological project. The neo-liberal government cutbacks in the field of education over

the last 25 years have created a shortfall of money for projects of any other aspect except

for those covered by a school's operating budget. Education in Canada is a provincial

task, specifically in this case study the Ministry of Education sanctioned the request for

the ETSB to acquire loans for the Enhanced Learning Strategy.

The Eastern Townships Education Foundation (ETEF) was originally brought together to do fundraising for the ETSB as well as renew scholarships and raise money for improvement projects. Leah Fitzgerald, of *The Record*, wrote an article in May of 2005 as an exposé of the role of the ETEF. Part of the growth of the ETEF has been the support of the Enhanced Learning Strategy. The reason that the ETEF has taken on the fundraising for the ELS is because educational support in Canada is a new venture. Before the ETEF was asked to fundraise for the ELS, the Director General of the ETSB, Ron Canuel, applied to many U.S. foundations and was told: "Great project, but you're outside the continental U.S." (The Record, May 5, 2005). Large foundations are not as common in Canada that is why the decision was taken to request a special loan approved by the province. The loan was required to meet the leasing options with Apple Canada. My focus in this project has been about the laptop in the learning environment. From a sociological perspective it is important to understand as many aspects of a project as possible. I include this synopsis on funding because without the support of this young foundation the laptop program would have had difficulty surviving—the Minister of Education has thus far refused to supply funding for this strategy.

The fundraising role of ETEF can be compared to the experience of Tina Petrone, the science chair of a high school in Pennsylvania, and her relentless efforts in grant writing to raise money for the school's technology integration. Through the dedication of many staff members and much hard work, 7 grants were secured for a Greenhouse project that involved linkages with the community (Gooden, 1996). The Director General of the ETSB, Ron Canuel also made many applications to foundations such as the Gates foundation in the U.S. without success. The exposé in *The Record* was written to raise

awareness about the fundraising elements that are being undertaken to support the ELS. It was also expressed in the Fitzgerald article that before the "campaign goes public" it is vital to the foundation to have corporate and government sponsors on board. It is also important to recognize and note that now a school board requires the support of a foundation to grow and maintain a technology integration. The neo-liberal government cutbacks in education have forced school boards to seek corporate sponsorship for technological integration.

In the Eastern Townships there are real concerns of employment of the Anglophone population, few jobs, graduates must leave to find jobs. However, the new focus on the Knowledge Society can provide an advantage since the new technology often eliminates the issue of distance. Thus, the ETSB is aiming to develop the human capital of this cohort of students by taking advantage of this new technology. Students in the laptop program will have the advantage of learning problem-solving—hands-on active learning—as well as developing communication and presentation skills. Communication and presentation skills get polished at school and these skills are also used socially—i.e. MSN Messenger and chat rooms develop communication skills. With technology and communication skills come responsible actions—this is where the newly reformed curriculum takes center stage. Skills of tolerance, understanding, and the development of the individual are part of the curriculum.

The laptop initiative is not the first curriculum change in the ETSB. The provincial government undertook a revision to the curriculum during the late '90s due to a number of factors—an increasing dropout rate, and a call for more technologically

literate individuals are but two examples. This curriculum revision covers many components which are well documented on the Media in Education website.

A revised curriculum is one component of the The Learning Environment. Other factors involved in this Learning Environment transition are due to the economic and political influences of transnational corporations. Society has changed from an Industrial based economy to that of a Knowledge based economy. A consumer based economy requires technologically talented professionals to compete in the current market. A combination of technology, and communication skills are more easily maintained creating an ever adaptable capable graduate for the Knowledge Society.

The Knowledge Society/Information Society

Webster and Robins (2004) refine the connection between information/knowledge and power. Depending on the focus of the author, the terms 'Knowledge Society''Information Society' and 'Knowledge Capitalism' are all coined as transitional terms. This background information connects the underlying purpose of the laptop strategy to the field of education—introduction of technology and the development of critical thinking skills. Two central components to the cohesion and reproduction of capitalist societies are first a mechanism for social management for planning and administration and second the heart of surveillance and control strategies (Webster & Robins, 2004). These two [actions] are relational and reinforce each other—they represent the micro-politics of power, from a Foucauldian perspective a capillary form of power's existence (Webster & Robins, 2004).

There is a relationship between planning and control. There are two types of resources: allocative (that include planning and administration), and authoritative (that

include power and control). Under the element of control fall surveillance and the control of information which leads to the key expansion of resources. From a governmental position it is wise to gather as much information/knowledge about your population providing surveillance information for the nation state and capitalist economies (Webster & Robins, 2004).

Capitalist economies are consumer oriented and are dependent upon the collection, analysis and incorporation of information (for example the collection of data patterns, specialization of demographic and socioeconomic information as well as detailed recording of trends and patterns of sales). Consumer behaviour is monitored and manipulated by advertising. The use of company credit cards is an example of spending habits that are recorded and then later used by companies to entice the consumer to spend in areas already known to the corporation because of this previously collected data.

Innovation is not new. This process began many years ago as an extension and intensification [enhancement] of Scientific Management, now a further step is the Information Revolution. Strategies are then regulated by 'consumption engineers' who manipulate economic transactions and consumer behaviour (Webster and Robins, 2004).

Advocates of big business use the framework of 'rational' and 'scientific' exploitation of information in society. The descendants of this exploitation process are known as, multinational advertisers, market researchers, opinion pollers, and data brokers. These afore-mentioned information brokers are the spin doctors of information politics today. The promotion and development of cable systems, communication satellites, telecommunications links and computer resources are the makings of a global network marketplace. The growth and use of this global network marketplace has social

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functions and activities that are available on-line such as education, shopping, entertainment etc. Communication and technology increase the scale or outreach that renders the Scientific Management of consumer life more efficient (Webster & Robins, 2004).

Webster and Robins (2004) refer to the fantasy of society being a cybernetic marketplace that produces and [is] a consuming machine—dating back to Taylorism and Gantt. To keep the world marketing machine running, global market research and advertising are required to create and implement propaganda—product or corporation promotion. The surveillance and monitoring of this consumer machine is an instrument. Information and intelligence agencies are transnationals that employ the tasks of 'mind management'(Webster & Robins, 2004: 70). The integration of information business concerns range from the communications media that are shaped by new information politics. The press, radio and television are governed by advertising for example, narrowcasting is a form of targeted advertising. Cable television collects data from people meters—via monitored families. Supermarket scanners are a form of consumer monitoring as well as credit card information being used to monitor purchaser activity.

Scientific Management of marketing is enhanced by new technologies. Information, surveillance, efficiency, these are the principles of Taylorism–intensified, extended and automated via the application of new communications and information technology. What has been ignored is the fundamental aspect of the communications revolution–the refinement of planning and control of consumer behaviour, an integral part of the early philosophy of Scientific Management (Webster & Robins, 2004).

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A cultural phenomenon in recent years has been the combination of the public

sphere and the cybernetic state in addition is the growth of the programmed market—a

regulated and coded consumer society. Notice within this snapshot, a more 'rationalized

and regulated' way of life that incorporates the stimulation of needs, the recording of

tastes and the surveillance of consumption. A sign of modernity is the role of

information and communications in the political process that shows a tendency of

combined planning and control (Webster & Robins, 2004).

Information and knowledge are the products of our global knowledge economy—

innovation and ability to apply knowledge-based thinking and problem solving skills is

essential for a country's economy. A website based in New Zealand clarifies that it is the

Information and Communication Technologies (ICT) that are the tools for a pathway to

change:

> *ICT releases people's creative potential and knowledge* [What about
> information and communication technologies (ICT)?] ICT are the enablers
> of change. They do not by themselves create transformations in society.
> ICT are best regarded as the facilitators of knowledge creation in
> innovative societies (OECD, 1996). The new economics looks at ICT not
> as drivers of change but as tools for releasing the creative potential and
> knowledge embodied in people (Government of New Zealand, 1999).

Technology is not a panacea itself—it takes thoughtful integration and teaching

practice to develop strategies of learning. K. Patricia Cross (2000), senior fellow at the

League for Innovation, believes that it is through the development of strategies of

learning that the student has the opportunity to develop the connections that make "the

content, the context and community" components in a learning strategy (cited in Milliron

& Miles, 2000). Cross (2000) also emphasizes that it is the creation of connections to the

community—using technologies such as e-mail, listserves, newsgroups, chat rooms—that can bring people together who can communicate with and learn from each other.

Students immersed in ICT will learn at different rates and develop new literacy skills—sometimes referred to as 21st century skills. A flexibility of learning and adaptation to changing technologies are skills that students require for the future. It is this unpredictability that students need to prepare for since they can expect to be employed in many jobs in their lifetimes. Sara Armstrong and David Warlick (2004) are both experienced educators who are involved in the field of technology as consultants and project leaders. They believe that the 3Rs (Reading, Writing and Arithematic) are evolving into the 4Es of the digital worlds: Exposing Knowledge, Employing Information, Expressing Ideas, and Ethics on the Internet.[1]

The Knowledge Society and the Learning Environment are two key elements in this study about laptops in the learning environment. A third significant element is the Curriculum and it too has changed. The Quebec Education Curriculum has undergone changes and the new curriculum is referred to as 'The Reform' by the teachers and administrators in the school board.

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[1] The 4Es that have evolved from the 3Rs are taken from an article called *The New Literacy* written by Armstrong and Warlick (2004). [see Appendix B for a more complete discussion of the transitioned 3Rs]

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The Quebec Education Curriculum

The Quebec education reform began in 2000 and is the most ambitious reform undertaken in the province in the last 30 years (Media in Education, n.d.). Structurally grades are being replaced by *cycles*. Within the Quebec education program the cycles are as follows:

Elementary
      Cycle One: Kindergarten, Grade 1 and Grade 2
      Cycle Two: Grade 3 and Grade 4
      Cycle Three: Grade 5 and Grade 6
Secondary
      Cycle Four: Secondary I, II, and III
      Cycle Five: Secondary IV and V(Media in Education, n.d.)

The elementary program beginning with Cycle One was implemented in 2000-2001 followed by the next cycle each school year after. The secondary schools began implementing the education reform in Fall 2005, while Cycle Four and Cycle Five will be implemented in 2006 (Media in Education, n.d.).

The purpose of cycles is for the student to have one year to acquire new learnings and one year to consolidate learnings. Diverse teaching strategies are adopted to encourage active learning—i.e., multi-age classrooms, peer-tutoring, team-teaching, cooperative learning, and creation of learning portfolios.

The curriculum is an essential element of the learning environment—especially because the Quebec school curriculum is undergoing a major retooling. In 1995, the government undertook a study to improve the successful outcome of all high school students. The major reason for the change in curriculum was because 40% of secondary students in the province of Quebec were not completing their high school education (QUESN-RÉCIT, n.d.).

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According to the Media in Education in Quebec internet site, Quebec's Education reform stresses human capital skills in that the soft skills of communication are given a high priority.

> cross-curricular competencies and learning, interdisciplinary teaching strategies, collaborative student centred instructional strategies, project-based learning and lifelong learning (Media in Education, n.d.).

Lifelong learning is also part of the new reform. It is important that both students and teachers remain flexible and able to work together towards achieving a goal. There is a great emphasis on teamwork and developing a sense of the greater world as well as a sense of oneself and the place you occupy in that world.

> Canadians can now anticipate three or four different careers requiring increasingly diverse skills during our working lives. (Information Highway Advisory Council, September 1997)

The digitization of the global economy has been an ongoing transformation since the mid 1990s. It is not surprising that a school board would employ technology since it is recommended within the new curriculum to give the student population an advantage in our knowledge economy.

One of the consequences of this transformation is that the business sector and the education sector have become linked through an economic push to digitize structures to take full advantage of a global economy. Valuable resources facilitate the linking of information technology that I have found available, one is provincial and the other is federal. The provincial network, the QUESN-RÉCIT, services both the English and French communities. SchoolNet, the federal initiative, is a connector of Canadian schools to improve knowledge-based learning while using information and communication technology skills and building partnerships. Both these informative web

sites also act as giant portfolios to connect ongoing and completed projects—a sharing of knowledge. SchoolNet has been in existence since March 30, 1999—the mandate of the site being to connect Canadian schools and libraries to the Internet (SchoolNet). The QUESN-RÉCIT is a network for Quebec Educators that helps to provide a pedagogical vision through electronic communication.[2]

While these two web sites are very useful tools in the Final Report of the Information Highway Advisory Council (1997), it is stated that from a Canadian government standpoint it would be wise to have a central committee to encourage lifelong learning and information technologies as well as human capital skills. These are all issues that need to be explored and discussed by a common body of participants—i.e. government, educators, and learners. At the moment there is no common mechanism to research and develop like information technology issues. More development needs to be achieved in the educational software arena. Since this is a new field of development, I am sure new policy research will continue to build bridges between the work, education, and government sectors. Each of these sectors will bring their own concerns to the discussion. What I have found in the education sector is that the practice of teaching and the curriculum content are more important than the delivery tool. This may have to be reconsidered in order to build technology skills into the practice of teaching. The reformed curriculum of the provincial government has noted the role of socialization in a multicultural country and has thus incorporated human capital skills of tolerance and components to develop citizenship.

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[2] It is not clear from their web site when this group came into existence, possibly 2001, because that is the first budget that is listed for the public.

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CHAPTER TWO

Literature Review

Introducing laptops into the learning environment is a recent phenomenon in Canada. Most of the existing literature reviewed is American, British or Australian. Nevertheless, several themes emerge that likely apply to the Canadian situation: student engagement/active learning, teaching practice, self-discipline when using the laptop, and lifelong learning also referred to as Professional Development. Student engagement is linked to active learning rather than the previous classroom situation where the teacher was the dispenser of all knowledge. Teaching practice is evolving to include skills of communication, technology, and curriculum development to bring the learning environment into the 21st century. Within the framework of a laptop environment students and teachers have the opportunity to be producers of data through active learning. Al November (1998) writes that the interaction between a laptop and the learning environment creates a form of ownership of learning (enhanced learning). In Quebec, implementing a laptop into the learning environment along with the Reform provided two components that blend to make a comprehensive and active form of learning. First, active learning is experiencing a project either through simulation or creating a collaborative project and following the steps through to the completion of the project. Second, student engagement happens with the introduction of the laptop into the curriculum and the students are able to actively seek information and interact with their data collection.

The work exposed in this Literature Review will cover many of the challenges about learning and teaching perspectives that create the multi-faceted experience of

laptops in the learning environment. The literature about technology integration in the

learning environment currently shows various perspectives.

Maine Learning Technology Initiative

The Maine School Initiative is where the ETSB began exploring Laptops in the

Learning Environment. They sent a delegation of teachers and administrators to this

school in Maine to explore the implementation of laptops. I begin with this Middle

School Initiative because it is where the ETSB began their own form of active learning.

The Maine Learning Technology Initiative shares a similarity to the ETSB Enhanced

Learning Strategy in that they are both Apple laptop initiatives.

> **Much more than a Technology Project:** The Maine Learning
> Technology Initiative accomplishes this vision of transforming teaching
> and learning as we know it by providing the funding to equip all 7th and
> 8th grade public school students and teachers across the state with portable
> computers beginning in 2002. In Maine, the issue of access to computers
> in schools will no longer focus on improving the computer to student ratio.
> With this plan in place teachers and students will have one-to-one access
> making the computer a ubiquitous tool for the educator and the learner.
> Wireless access to the internet will allow students and teachers to acquire
> information that is not available through conventional methods. In
> addition, curriculum is being developed that will leverage this technology
> so that both teachers and students will excel in a world that is driven by
> information. (www.state.me.us/mlte/)

I obtained a report that was published in February 2004, "The Impact of Maine's

One-to-one Laptop Program on Middle School Teachers and Students" by Silvernail &

Lane (2004). The report is very encouraging, with one exception: that when the students

move on to the 9th grade they do not thrive because of the lack of technology to help them

do their work. The other outstanding factor that teachers related was that they require

more technical support, more professional development activities and more time for

planning their curriculum than previously. A final significant note is that the cost of the implementation was higher than expected.

Among the conclusions was the observation that in the more successful laptop programs technological support was provided by student technology support teams. Overall the report is very positive with regards to the integration and implementation of the laptop initiative. In addition, they state that over time and with more study and analysis they will be able to track and assess the results of this laptop initiative. This is one of the few laptop initiatives that had an outside evaluation performed.

This initial study uses technology in the middle school years and then leaves the use of technology up to the student. It was not clear why the decision was made to have the integration for the middle school years. From this case study we can see that active learning is a component of laptop learning.

Student-centered learning [active learning]

Al November is a former teacher turned education consultant who promotes active learning through the various workshops and Professional Development that he has developed for his company NovemberLearning.com. November (2001) is adept at describing anecdotes that everyone can relate to and this is how he opens his article "Drill the Teachers, Educate the Kids."

> There is a famous story that describes what needs to be done when you
> want to hang a picture on the wall. You go to the hardware store to buy a
> drill bit to make the hole for the hook. You don't really need the drill, you
> need a hole, but the hardware store doesn't carry holes, only drill bits.
> While the drill bit is important, it is two steps removed from what really
> needs to be done, hanging the picture (novemberlearning.com).

Professional development for staff for the use of technology is much like this drill bit in this story. The goal is to improve student learning—the focus needs to be on how the

students learn and not be concerned about the technical abilities of the teachers, which will improve with time. November advises teachers to engage with the students that observation is not enough and to take it a step further by developing shared experiences with their colleagues.

In "Creating a New Culture of Teaching and Learning," November (1998), describes two ways to implement technology; Automating vs. Infomating. Using the technology as a tool and adding it on top of your current curriculum is known as *automating*. Finding ways to integrate the technology that combines technology and communication is *infomating*. When you *infomate* you are creating a new environment, a culture of teaching and learning. When you *automate* you don't change the curriculum, you simply continue what you have been doing all along except with more equipment. Automating is like adding a piece of equipment to the existing classroom. November promotes infomating as an ideal teaching practice because it blends technology and communication by engaging the student and teacher in a learning process.

Gary Stager is an educational consultant who has spent the last 15 years promoting one-to-one laptop programs. Stager (1995) developed the "in-classroom model" while working in the public school system in Scarsdale, New York and Wayne, New Jersey. When applying new practices in the classroom, teachers in Australian laptop schools have used the in-classroom model to encourage collaboration and motivation by team-teaching with a trainer (Stager, 1995). According to Stager, Australia has created a nurturing learning culture by promoting "that personal computing was a powerful idea, one more important that the computer themselves" (1995, 1). Stager is an educational consultant who has spent and continues to spend time in the classroom

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with every level of schooling. He promotes technology with a view to successful

implementations. Stager promotes many approaches to technology integration. His

belief is that combining workshops, in-classroom collaborations, mentoring, conferences,

and whole-learning residential workshops[3] reinforces active learning. There is little

research done in this area about what is the best methodology to implement a laptop with

therefore I do not know if Stager's methods are effective. Although, Australia has and

continues to use these methods of laptop integration (Stager, 1995). Next, Goddard

emphasizes the human dynamic, the people should lead the project and the technology

should follow, his view is slightly different than Stager's proactive approach to

technology.

Professional Development

Mark Goddard is a teacher who is in the Master's program of Teaching and

Learning at Washington State University. Goddard's article "What Do We Do with

These Computers? Reflections on Technology in the Classroom" from the *Journal of

Research on Technology in Education* (Fall 2002) is an example of thoughtful reflective

practice. This article is pivotal in explaining concepts of how teacher knowledge of

technology is essential to a strong basis of technology use in the classroom, thus

"enriching learning through student engagement" (Goddard, 2002: 24).

Goddard is concerned with the human dynamic—he writes "there needs to be a

progression of adoption and integration to technology" (Goddard, 2002: 21). Goddard

speaks of the people centered philosophy of author Donald Norman. Goddard writes

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[3] Whole-learning workshops are forms of Professional Development given by Gary Stager. He helps the teachers break down issues into concepts, giving them techniques to use or guiding them to self-discovery through planned exercises in collaborative groups.

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about the argument "that there is a trend to *not* let technology drive educational needs" (Goddard, 2002: 22). Technology is to be viewed as an instrument, a tool.

> This newer trend seems to arise from a growing concern about having a person-centered approach, or as Donald Norman (1993) so aptly describes it in his book *Things That Make Us Smart*, "People propose, science studies, technology conforms" (p. 253, Norman in Goddard, 2002).

Goddard stresses that by giving "the responsibility of meeting expectations for integration to the faculty" (2002, 23) this will create a sense of empowerment that will fuel collaboration and development of curriculum integration of available technology. This people-centered integration of technology puts the focus on the curriculum with technology as a supportive tool. Goddard is writing from a teacher's perspective— enhance the learning process, emphasize the curriculum, and have clear educational goals. Goddard (2002) argues that change is a difficult process but he also states that a combination of education reform and technology use can create a venue for the creation of higher-order thinking skills that can be used in and outside of the classroom. Goddard's article appears in an education Journal of Research on Technology in Education. In his conclusion he argues that "technologies evolve and change over time with the concurrent changes in social, political, and economic aspects of our world" (2002, 25). Goddard (2002) further argues that educational reform is linked to the social demands our times.

Next, is a case study that is larger than the Maine Initiative, it is a High School laptop integration in Henrico County, Virginia. Once again, it is an Apple laptop initiative. This study is the most similar to the ETSB Enhanced Learning Strategy.

Teaching & Learning Initiative

The next case study is Henrico County, Virginia; *Teaching & Learning Initiative,*

grade 6 - 12 teachers and students. "One-to-one Computing" has clear benefits. This is the largest single district "one-to-one computing" initiative in the U.S (//main.edc.org, June 2004). This is an Apple based laptop integration and indicates that planning and Professional Development as well as student empowerment are key factors in a successful laptop implementation.

> "Teachers report that the laptops have had "positive or "very positive" impacts on both gifted students and students with learning disabilities as well as on typical students. Teachers report that the computers have had "positive" or "very positive" impacts on students' engagement and interest levels, the teachers' interactions with students, and on students' ability to work independently (//main.edc.org)".

This initiative evaluated through "student achievement, attendance, standardized test scores, SOL achievement and observation of varied teaching methodologies through qualitative and quantitative measures" (PDF, Teaching & Learning, Henrico).

The report listed all the software that the teachers could use and what it does for them. The students are trained in the care of the Apple iBooks before they receive them. Henrico County has been preparing for 10 years through technology training in helping their teachers prepare for this transition and they are well supported through a rigorous Professional Development initiative. Student trainers are involved in this project and have on-site technical assistance with these assistants giving enriched lesson plan training as well on a regular basis. The Henrico County has a clear plan of action for the successful implementation and integration of their laptop initiative.

This report does not give many ethnographic details but does provide a detailed outline of how their technology plan has been put into action. The cost of the technology is built into the school's operating budget and each student pays an insurance fee to cover loss, theft and damage.

The Henrico study is a secondary school one-to-one laptop integration. What should also be noted as a limitation is that teacher self-reporting evaluation has been used to report on the Henrico County study. An outside evaluation would be less biased. There are clear goals of Professional Development and student engagement as well as active learning all relevant concepts within the Literature reviewed.

Following the Henrico County project is Kleiman's article about debunking myths about plugging in technology and everything will fall into place. Kleiman stresses that a shift in teaching practice is essential to a successful integration of technology. He uses an Apple study as a measure for "an instructional evolution" (2000, 11).

Paradigm shift—Teaching Practice

Educator, Glenn Kleiman (2000) has written about the process of integration of technology and how a multi-faceted [evolution in teaching practice] approach ensures support for the teaching professional. Kleiman's educational experience is in Professional Development and Educational Technology and is presently on the faculty of the Harvard Graduate School of Education.

Kleiman (2000) in the article "Myths and Realities about Technology in K-12 Schools" states that there is not a simple solution to the implementation of technology within a school, it is a process that involves many facets. A technology plan is not about the number of computers purchased it has broader implications of defining educational goals, the preparation and ongoing support of teachers, designing curriculum, dealing with issues of equity as well as remaining current (Kleiman, 2000).

Students need the teacher to provide guidance to help them analyze data on the internet. They also need to be engaged in learning. This Apple-based study is a form of

measurement for my own project—its relevancy lies in showing that measures of evaluation have been created. As I have stated previously, because this is a new field of study there are not many available studies to be found.

Kleiman tackles some of the most common myths about technology and the classroom beginning with "Myth #1: Putting computers into schools will directly improve learning; more computers will result in greater improvements (2000, 8)." Learning is not improved without Professional Development for teachers to know how to implement computers within the curriculum.

Kleiman also describes a long-term study of the Apple Classroom of Tomorrow (ACOT) and lists 5 stages of "instructional evolution"

1) The *entry stage:* teachers experience excitement and trepidation as they learn to master these new tools.
2) The *adoption stage:* this is when it becomes easier to incorporate the technology into the classroom; e.g. math—drill games, word processing for projects—these fit into the current curriculum.
3) The *adaptation stage:* the technology becomes integrated in many aspects, word processing, databases, graphic programs, presentation tools make a difference and the teacher is able to see the benefits in the student performance.
4) The *appropriation stage:* the teachers use the technology with expertise and ease and wonder how they did without it previously.
5) The *invention stage:* the teachers are now in a position to experiment with new forms of instruction. Interdisciplinary project-based learning, collaborative team teaching as well as individual paced learning plans can be implemented (2000, 11).

All of these stages require professional development and technical support for the teachers as well as changes in the curriculum and teaching practices. Kleiman (2000) states that it is important to remember that none of these changes take place overnight, the technology based classroom is an ongoing process. These different stages show possible professional growth stages for a "teaching evolution".

Kleiman (2000), gives a thorough accounting of a measure to gage the process of adaptation, an "intructional evolution" developed by in a long term Apple study. In comparison, Wiske, explores a particular method, videotaping, to show that curriculum planning can be done collaboratively and even with this collaboration a professional interpretation [teaching style] can change the delivery of the material.

Clearly, adding a laptop to a learning environment is not a one step process. Wiske (2000), argues that one of the first steps is to shift the traditional practice of teaching in order to engage teacher and student in active learning. James Stigler and James Hiebert in their recent book *The Teaching Gap* (1999) review the results of the Third International Mathematics and Science Study (TIMSS). TIMSS compared math and science achievement among fourth, eighth, and twelfth grade students in 41 nations (cited in Wiske, 2000). In one part of the study, sessions were videotaped, Stigler and Hiebert analyzed the tapes of Germany, Japan, and the United States. These sessions showed clearly the difference in teaching practice—in Japan the students were challenged by their teachers to problem solve, share and collaborate with their peers to find solutions. The students from the U.S. and Germany were taught procedures to solve problems. In Japan, however, it is important to note, the shift in teaching did not occur easily or quickly (Stigler and Hiebert in Wiske, 2000). The different method adopted of active learning and teaching in Japan, whereby engaging the student and promoting collaboration rather than teaching a procedure to an individual as in U.S. and Germany has been a success. This active learning and collaboration prepares a student to be able to continue the process of learning after their high school education.

According to Stigler and Hiebert key initiatives of the Professional Development in Japan were collaborative lesson planning and collaborative assessment as part of a reflective teaching practice. A primary difference between the U.S. and Japanese school day is that Japanese have built time into the school day for collaboration and strategy planning. The TIMSS study indicates that there is not enough, if any time, given to U.S. teachers to strategize and collaborate and build a reflective teaching practice (cited in Wiske, 2000).

A valuable Professional Development tool was developed from this study—a one-hour videotape from the TIMSS tapes "Eighth-Grade Mathematics Lessons: United States, Japan, and Germany"(cited in Wiske, Stigler and Hiebert, 2000). This tool will enable teachers to see that feedback, collaboration from colleagues, and building time into the school day are essential elements in building a reflective teaching practice.

A relevant case study, about teaching practice was completed in Tampa, Florida in 2004. A teacher is not always aware of their teaching style and through videotaping classroom experiences coupled with reflective interviews, teachers were able to see a difference in teaching and learning styles. One such example from this case study by Kemker & Barron was teachers can have a rule driven classroom-meaning the teacher was the technician; and there were classrooms where the integration was part of the lesson plan-students learned to help themselves and their fellow students. Even though these teachers did collaborative lesson plans, their classroom management practices were different thus affecting the integration of the laptop. This was only noticed due to the videotaping and further reflective interviews done with the teacher and researcher (Kemker & Barron, 2004). The similarity of videotaping was a useful tool for

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researchers in the TIMSS study and the study in Tampa. The researchers were able to visually decipher different outcomes through reflective practice.

To follow up on these two studies I also found Howard Gardner had a plan of action that involved cognition and learning. It is not always observable, that learning is a different acitivity for all and teaching practice does not always stimulate all students. Gardner places an emphasis on using intelligence to develop critical thinking skills [curriculum] for the use of technology integration.

Multiple ways to learn

Howard Gardner is a Professor in Cognition and Education [his main body of work being with Multiple Intelligences (MI) theory]. Gardner (2000) has a two step approach to the use of technology—the skill of respecting other people and the task of developing a critical framework to analyze what is being learned via the internet. He emphasizes the maintenance of educational goals rather than technology. In his article, "Can Technology Exploit Our Many Ways of Knowing?", he states that if you are going to use technology it is important to provide technical assistance as well as Professional Development to ensure a useful transition. Providing hands-on experience through the use of computer simulations allows teachers to challenge a student and also communicate with experts in the field of study (Gardner, 2000). This is an excellent example of active learning that engages both the student and teacher.

Gardner (2000), also argues that human beings have "at least eight forms of intelligence." He challenges teachers to reach out to their students by engaging them with more than "words and numbers" and believes in two broad areas of education: teach children to be respectful towards each other [good citizens], and teach them how to

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critically analyze and be discriminating consumers of the knowledge that is available over the internet. Finally, he argues that the combination of curriculum and technology could be beneficial to students if clear educational goals are maintained (Gardner, 2000).

Gardner moves us down the path of clear educational goals to the next case study in Wolfeboro, New Hampshire. "Anytime, Anywhere" identifies learning as a continuous activity that is being nurtured by a committed group of teachers. I included this study as a different experience because it is in the private system and the study shows smaller classes and individual learning pathways.

Philosophy "Anytime, Anywhere"

The next case study deals with Brewster Academy, it is a secondary boarding school in Wolfeboro, New Hampshire. They have implemented a technology based curriculum whereby the students all have a laptop for use anywhere and everywhere in keeping with their philosophy--that learning happens everywhere not just in the classroom.

> At the foundation of the Brewster difference is the School Design Model^{SM} (SDM^{SM}), a successful program that began 10 years ago. It is based on implementing best teaching practices; collaborative learning; curricula development for individualized learning styles and abilities; authentic assessment and evaluation; faculty professional development; and specialized authoring tools to develop and implement curricula. Results include an average improvement of 92 points on SAT scores and a 10 percentile place improvement on PSAT scores (International Journal of Educational Reform, April 2000).
> www.brewsteracademy.org/Pages/Information/about_brewster.html

The students use Apple PowerBooks and iBooks in an interactive curriculum that is individually based for success. The student progresses through group interactivity and their own work at their own level while meeting regularly with an advisor. The class

ratio is approximately 11 students to one professor. The students submit their work online to their professors and then move on to the next project (Brewster website). This school has taken full advantage of the technology available and implemented it along with individual learning as well as collaborative teaching styles to give these students every advantage in an ongoing education.

This study pushes the boundaries of the learning environment even further by encouraging the students to achieve at their own rates within an encouraging structure. I included this study to demonstrate the one to one style of learning as well as the teacher collaboration style.

This case study is set in a private school. Brewster Academy has made a complete commitment to the implementation of laptop learning supported by Professional Development and curriculum that is individualized for each student, the ratio of teacher to student is very low providing the students with greater support and an enriched personal development. The main concepts of teacher collaboration, and learning at an individual rate support this laptop integration. Stager would argue that this is ideal laptop integration.

While the teachers at Brewster Academy are dedicated to individualized learning, Westreich writes about a double-edged sword in the field of technology integration. She explores the valuable experience of colloboration of professionals to create educational software and looks at the research questions that remain unanswered regarding childhood development and laptop integration.

"Trailblazers or Guinea Pigs?"

Joan Westreich (2000) presents a snap-shot of how a valid software experience within a learning environment can enhance learning. Nevertheless, she cautions that there is little research to support implementing technology and demonstrates that there are always two sides to a cutting-edge issue.

She describes the two-sides in "High-Tech Kids: Trailblazers or Guinea Pigs?" which presents a critical viewpoint of the introduction of technology into the classroom.

Westreich argues that having access to the personnel who have the knowledge to create software that is a simulation of a virtual dig called Archaeotype has been a successful initiative of an independent school in New York City. This 11 week virtual dig engages the students in hands-on active learning. This is the first side of the coin- personnel who collaborated in the creation of the program that has been used for 12 years (Westreich: 2000).

Secondly, Jane Healy (2000), an educational psychologist, raises concerns about too much technology injected into curriculums without much previous research of any interaction regarding children's social health, physical health or children's brains (cited in Westreich). While Healy agrees for the most part with technology in the learning environment, she voices concerns based on the development of the child. Healy writes that a child should not be using technology in the classroom before the age of seven "when they develop the capacity to think symbolically and concretely" (cited in Westreich, 2000: 21). Healy also expressed concerns about game-like software during an interview with the *Harvard Education Letter;*

> It is done too quickly, without language, thought, or much envisioning on
> the part of children. These types of experiences empty their minds of the

attributes that make people imaginative, creative, and thoughtful. In addition, with many applications, children are reduced to the level of tools of the machine, learning to punch buttons as fast as they can to get a nice reward (Healy cited in Westreich, 2000: 22).

Westreich has shown both perspectives in this article; trailblazers (Archaeotype) and guinea pigs (Healy's evaluation). This article is written from an informative perspective and does not provide any resolution to technology integration.

Westreich engages the reader concerning the validity of meaningful software created by a collaboration of professionals. Moore, echoes what Westreich explains, that meaningful curriculum content is not easily created or found in existing software. Moore understands from a design perspective that teachers face time constraints and must plan accordingly.

Curriculum and Content

James Moore (2003), teaches instructional design at the Harvard Graduate School of Education. He looks at how different levels of expertise can affect a technology implementation as well as how access to meaningful curriculum content is not easily found for a digital classroom. In his article "Don't Make Me Think! I'm Trying to Teach: Designing Web Environments that Enrich Teachers' Work," the title portrays the main essence of the article. This article focuses on time constraints faced by teachers as well as finding content based educational web environments that are not too difficult to navigate and are easily understood for classroom applications. He argues that a significant difficulty lies in the fact that not all teachers teach the same way and not all designers create for the same purposes. Curriculum access is not easily found for digital classrooms, educational sites can have fees and useful educational software is not plentiful. The market has become flooded with web environments that offer almost too

much visual stimulation without giving enough weight to content, or in some cases too much information is presented but not in a straightforward manner.

> Many teachers I speak with point out that they are often unable to use many web environments in their teaching, even those designed for education, because constraints on their time and resources limit their ability to figure out how to use the many features of the site effectively. "I don't want to think about a whole new interface each time I use a new website in my teaching" is a common remark. Others observe that even many educationally sound web environments don't provide sufficient flexibility to be used with their approach to teaching, or don't support the schedule of classroom teachers. "How can I use an online lesson-planning tool that requires three hours to complete when I only have an hour each day for writing lessons? (Moore, 2003: 66)."

Moore (2003) breaks down the search for useful educational web design by stressing many steps including a clear pedagogical framework, an educational agenda and accurate content to produce meaning for teachers and learners.

Moore creates a useful framework for teachers to follow by honoring clear content based websites while pointing out the time-wasters of too many pictures and too many fancy buttons that do not lead to anything useful for the classroom except wasting time.

CHAPTER THREE

Methodology

This qualitative study is an ethnographic representation of a cohort of students and teachers that are adjusting to the addition of a laptop to their learning environment. This research is not trying to test a hypothesis, but rather is inductive and exploratory in form. In addition, since the literature review revealed very little Canadian documentation regarding this field of study, my secondary objective is simply to add to this documentation.

Sampling

I interviewed six students from grade 5 and five students from Level 5 (grade 11). I also attended a conference in April of 2005 called *Showcase*. At the *Showcase* conference delegates, 5 to a group (of which I was one), were able to attend classes at a high school in the ETSB. As delegates we observed and asked questions relating to the laptops in the classroom. This classroom observation helped to strengthen and support the interviews I conducted. I also interviewed six student teachers and one grade 4 teacher with 5 years of teaching experience. The student teachers were all in their final practicum, a 13 week teaching session in a school within the ETSB, and graduated June 11, 2005. The research sample population totaled 18 people not including the classroom observations from the *Showcase* conference. (see Appendix D for an explanation of a previous methodology)

Interviews

As lead and only researcher I prepared the questionnaires which can be found in Appendix B under *Research Tools*. The questions focused on exploring the use of a

laptop by both the teacher and student. The interviews were digitally recorded, transcribed, and then the recording was transferred to a CD-Rom disk to keep for no longer than 1 year after the publication of this research.

All but one of the interviews with the grade 5 students took place at their homes. The one outside the home took place in a common room at a nearby University for the convenience of an after school interview. These interviews lasted about 30-40 minutes.

The Grade 5 cohort of students was very keen to be interviewed. I wanted these students to show me what they do with the laptop in the classroom and what they do with them at home. The first interview was quite lengthy and this student showed me everything about her laptop. For example, the grade 5 students are interested in the digital imaging and movie-making abilities of the laptop for their Language Arts class. At the end of the interview each interviewee provided me with one or sometimes many possible interview subjects. All of the respondents that I requested interviews with responded positively from this sample of grade 5 students.

The Level 5 (high school) students interviewed were all from the same school. The sample consisted of 2 women and 3 men. Some came to my house for an interview and for others I went to their house, whatever method was the most convenient for the student. These interviews lasted 30-40 minutes.

The Level 5 students were a very busy cohort; being much more involved in school life, sports, student council and preparing for their final exams this group consider the laptop as a tool for keyboarding papers for various projects. The focus of the questions in the interview was to determine the use of the laptop in their classroom and at home. The same interview guide was used for the grades 5 and 11 students. Scheduling

interviews with this sample of Level 5 students was a challenge because they had after school jobs, or sporting activities, or were studying for exams.

At the elementary level the teachers were all clustered in grade 4 with one teaching a combined grade 4-5 class, and one a resource teacher in grade 3. All of the elementary school teachers were women, two had 5 years of teaching experience. I contacted the only 2 men enrolled in the final year of the education program at Bishop's University in 2005 but only 1 agreed to an interview. Some of these teachers came to my home, others were interviewed in their homes and some I met in a local restaurant over coffee.

There were 2 high school teachers with practicum experience interviewed (one woman and one man). The woman teaches at a Level 1 ALPS level—she teaches learning challenged students; she has students at various reading levels. The man teaches at Level 2, two history classes and two English classes—one English being an enriched class.

Showcase Conference 2005

The opportunity for classroom observation and the subsequent supportive inquiry groups was the result of attending the *Showcase* conference sponsored by a foundation (ETEF) that has been created to support the laptop initiative in the ETSB. Out of these classroom observations came the opportunity to question 2 informal groups of Level 5 students who attended the same high school about their experience with the laptop. Small groups of 5 and 6 conference participants toured several classrooms. This was the final day of a 3-day conference and people were looking for concrete information to take back to their school boards or research projects. Not everyone attended all 3 days of the conference therefore the group dynamic kept changing.

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The focus of the Showcase conference was to allow educators and administrators a first-hand view of how students and teachers use the laptops in the classroom. Groups of delegates toured two level 5 classrooms; both were made up of approximately 30 students and both were a Moral and Ethics Class {ME Class}. The groups of delegates entered the classroom and introduced themselves. The group I was with included an IT director from a high school in Alberta, a representative from the Lakeshore School Board, and a few local school board members.

Challenges and Limitations

Firstly, the teachers of the ETSB had been asked not to talk to anyone outside of the school system about the Enhanced Learning Strategy. After asking several teachers for an interview, one of them finally told me that they had signed an exclusive research agreement with a Professor in the Education department at Concordia University and thus could not participate. This response seemed reasonable until I learned that the Professor in Education at Concordia had his funding cut significantly in the second year of research and that the exclusivity agreement was no longer valid. I re-approached a number of teachers in hopes that they would reconsider either doing an interview or answering a survey. Unfortunately they all responded negatively, even some whom I have known for a number of years. As a teacher, it was a question of employment. English speaking teachers in the Eastern Townships are hired by the Eastern Townships School Board and they will not do anything to jeopardize a good employment relationship.

Secondly, at the beginning of this project there was negative press in the local newspaper because parents were not consulted about the laptop initiatve. The school board asked the teaching professionals and staff not to discuss anything related to the

Enhanced Learning Strategy with anyone outside of the school board and to direct all inquiries through a school board public relations director.

The student teachers I interviewed had not signed any agreement. I approached them as a researcher who wanted to share their classroom experience and they had no reservations about proceeding with an interview. Student teachers have an excellent sense of classroom dynamics—a number of the student teachers gained experience during their undergraduate years by doing substitute teaching. I decided to approach the student teachers directly. This came about quite easily because my husband is the hockey coach for the Women's hockey team at Bishop's University. I began with a simple conversation about my project with one education student on the team and my interviewing snowballed from there. The sample includes six student teachers and one grade 4 teacher[4]. Of the student teachers I interviewed—two were high school teachers and five were elementary school teachers. This sample of teachers was eager to share their experience about using laptops in the learning environment. One teacher had worked closely with her host teacher to construct a handbook about *reading responses* a part of the Language Arts curriculum.

The overall limitation to my project was not being able to interview teachers because of another researcher's exclusivity agreement and the school board's request. I did contact this researcher and he put me in contact with his lead researcher who did answer a number of my questions. As a result of limited sampling choices, I settled on an exploratory ethnographic case study based on an opportunistic sample of individuals— student teachers, grade 5 students, level 5 students and the supportive inquiry that I

gathered from the Showcase 2005 conference. What remained doable inspite of the sample limitations was the opportunity this provided to conduct an initial exploration of a new field of study from a Canadian perspective. Preliminary Findings from such an exploration can be used as a basis for further research and development with regards to initiative—especially with a focus on issues surrounding professional development and curriculum changes for elementary and secondary students.

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[4] I asked one of the student teachers if she thought that her host teacher would do an interview she said that she would ask her. I gave her some time to ask her and the student teacher did and then she provided me with the contact information and I made the contact and setup the interview.

CHAPTER FOUR

Findings

Elementary and High School comparison

When comparing and contrasting the similarities and differences between the

ways elementary and secondary students use the laptop, the lines between home and

school become blurred. School work becomes play and vice versa. Both cohorts of

students have been exposed to technology either at school or home. What is new, for both

groups, is the use of the laptop within a formal learning environment.

One difference between the groups is that the elementary students play with the

laptop at home with their friends and experiment with the software, this is not always the

case at the secondary level. Both home and school use are described in this example:

> *What do you like best about your laptop?*
> I like that you can go on the Internet and get AppleWorks and draw,
> Unfortunately, because the grade 6's test, [testing in January] see I do not
> have permission to use AppleWorks, because you can mess around with
> pictures. And I like the Internet 'cause you can do stuff on the internet
> and iMovies is my favourite thing.
>
> *O.K., so tell me about iMovies;*
> We have made iMovies in class and with friends, me and Peter made
> some, my friends, me and Pat invented James Phat. I have lost that movie
> unfortunately. This is the movie that me and Peter made, not completed. I
> will show you a SpongeBob one, where is SuperSponge? There we go,
> we have a lot of SpongeBob pictures, I have got all of these [....]
>
> *You are stringing the images together; do you put text with them?*
> I can, I have photos from iPhoto, you can get audio from iTunes, you can
> get titles, you can make it centered, you can do Trans(transitions[5]) and put
> it in here...Here I will show you what I mean by that, (transitions) black
> and white background changes, you can put it into a DVD but we don't
> have the stuff to do that on this laptop anyways; and then that's iMovie,
> one of my favourite parts, you can get big, big picture for your

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[5] Transitions are background changes that can slowly fade in and out depending on how you build them into your project. This is similar to transitions when using Power Point, only there are more options depending upon the picture you are transforming.

background, you can get Cliptime, you can save your movie on Cliptime. You can put it into DVD but we don't have the stuff to do that on this laptop. You can get big, big pictures, you can get Quicktime and save your iMovie on that (E13s)[6]

Gary Stager encourages the students [and teachers] to find ways to be creative with their laptop either by construction of imaginative creatures or by using the laptop to discover their own sense of creativity. This example of the students playing with the software and creating characters demonstrates what Stager promotes, a creative process that builds a form of active learning (www.stager.org).

While the elementary students are playing with the iMovie software, many of the secondary students sampled had not used the iMovie software until they were given a project to do for their French class. Three secondary students involved in this research filmed a production that was an assignment for French class.

> *Do you use the iMovie or Power Point?*
> I haven't used Power Point yet. Our French Teacher gave us an assignment and we went home and we recorded our home movie and plugged in the cable and figured it out—we got 105%! Because there was bonus marks for following everything that the teacher asked us to do. We added in all these neat effects and we got perfect on the curriculum—we were one of the 2 groups that handed it in on time—so we got a 5% bonus. So it is iMovie—it is probably the best program that Apple has working for them. We had no idea—we just plugged it in—and you don't have to worry about cutting anything and you can put in transitions (S2s).

This example demonstrates the play-like aspect of a homework assignment. However, while it is similar to the elementary school experience in that respect, the secondary students are also being graded for their ability to integrate the laptop into the assignment. At the same time, the assignment of a secondary language course becomes larger than the

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[6] E and an assigned number plus s for student is an elementary student from the sample interviews.
S and an assigned number plus s for student is a secondary student from the sample interviews.
All names within quotations have been changed to protect the anonymity of the participants in this study.

classroom because they can use drama to embellish their assignment and this involves a different set of language skills that might not have been learned within the classroom setting. Thus, as November (2001), argues the boundaries of the classroom are extended. A visual as well as audio aspect is also recorded for keeping.

These two examples straddle the line of at home and in class use of the laptop—the lines become blurred. Al November (2001), an educator who researches the use of technology would characterize this as *infomating*—the creation of a new learning environment integrating the laptop with the curriculum.

The portability aspect of the laptops is an organizing factor for these students. In the case of this High school student the laptop organizes his paper and he also uses the laptop to organize his CD collection.

> *What do you think your favourite thing is with the laptop?*
> My favourite thing—well, it is pretty neat to have all of your music
> together in the same place—you don't have to keep track of your CDs and
> stuff you just put it on the memory of stuff. It is convenient but not really
> about staying on task at school—the iMovies. I am pretty impressed with,
> well, it is just nice like at noon if you started a writing assignment say you
> started it at home you can finish it if we didn't have laptops—it would
> have to completely done and you can finish it up; it gives you the
> convenience of carrying it with you—yah-but it gives you the convenience
> of handing in a professional assignment—a nice presentation package too
> (S2s).

The convenience of portability is appreciated--the laptop gives the student the choice to complete an assignment anywhere. In a case study about a secondary school in Wolfeboro, N.H. "Anytime, Anywhere" this type of learning is exemplified—they have had the use of Apple iBooks for the last 10 years and have tailored their own learning to the fact that learning is not isolated to the classroom (www.brewsteracademy.org).

Another major feature identified by the students interviewed is the multi-tasking that goes on when a student has more than one computer at home. The students can become quite creative. With a camera and some web design knowledge one secondary student set up 2 web sites: one for a Music Festival that donates the proceeds to the Children's Wish Foundation each summer, and the other site as a side business [antique truck parts] for a neighbour. Using a PC, this student has created a hobby with his technology skills.

> I have a PC and personally I wouldn't buy an Apple—maybe it's just different and I like MicroSoft.

> *Did it take you awhile to get adjusted?*
> It wasn't horrible—trial and error to find things. I have Windows Movie-maker—sort of the same thing—just not as fancy—there are a lot more effects on iMovie. Pretty much everything on my PC.

> *Can you show me your web site?*
> I have two [web sites]. I took it over 2 years ago and didn't change anything—until this year and then I redid all of it. This year I took pictures at the Music Festival and I will put them on the web site soon. The weather was almost too hot....

> *How did the [organizers from Music Festival] contact you?*
> I think they just mentioned it at one of the planning meetings. My parents kind of volunteered me.
> This is a parts [antique truck] web site for a neighbour –one year we took pictures of all of his truck parts. We [he and the neighbour] made a price list and put it all up (S4s).

S4s has also found a way to use his technology skills to give back to the community by volunteering his time to promote a local Music Festival. His parents have volunteered his services for a community Music Festival—this can be viewed as a form of perpetuating volunteerism.

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Not all is smooth, however, students at both the elementary and secondary levels admitted that the laptops could be a distraction during class time. These few examples indicate that the students are aware of the classroom expectations and understand the self-discipline required of them.

> *What else do you do in School?*
> Well, people go on the internet and play games, but they aren't supposed to.... (E10s).

> *...talk about his teacher; And does he use his computer a lot?*
> He uses his computer—Yes, he can tell what everyone is doing...to see if---People play games, and laptop on the cart....there goes your computer (E15s).

> *Is there anything that I may have left out or that you would like to add?*
> I think that it is a program that has great potential, but it's not right now—it would be a great program if the students were more disciplined—for one, it is just like—I don't know, it is almost like encouraging deceit—if you give a little boy a lollypop and say don't eat it—don't play games on the computer—it would be efficient if you could find a way to stop the chatting (S2s).

> *Do you like to play games on it?*
> Well, yeah, on these you can—you can't use the CD games—some people that's all they use it for in class....you can on the internet...some people that's all they use it for in class (S4s).

At the elementary level there are clear sanctions "for going off task" to quote one student. Such sanctions appear to be unnecessary at the secondary level. For the secondary level these examples give you an idea that it is a personal choice to stay on task—S2s [quote above] points to fact that the temptations of game playing and chatting have not been removed.

This expectation of behaviour in the classroom is known as governmentality, a form of self-regulation in this case the conduct is self-discipline (Foucault, 1995). This process of conduct is a construction of normalized conduct [institutional norms]. A

difference between expectations at the elementary and secondary level is that these

expectations that the students absorb from the hidden curriculum is what Posner refers to

as institutional norms (cited in Goddard, 2002). Secondary students in a level 5

classroom have the required knowledge about conduct.

In the following example a high school student suggests that Teachers have found

ways to maintain the focus of the student without implementing sanctions.

> *Your teachers are they comfortable with it?[chatting-MSN]*
> In Mr. X's class, he doesn't want us to take notes....it just depends on the
> teacher...Yep, in Mr. X's class, he calls them his teaching moments—he
> has us close the lids [laptop]. Our French teacher, Madame S.–does [the
> same] at the beginning of the class while she is explaining, she opens up
> her laptop and puts it on the screen and then we go (S2s).

S2s was aware of the classroom expectations. The teacher takes a few minutes to

explain the exercise then the students can open their laptop and proceed. This teaching

practice of explanation first and then having students proceed with a project is not new; it

is simply a way to ensure that students are attentive during the assignment of a project.

Elementary School Teacher Interviews

The elementary and high school teachers faced similar challenges. The most

common related to how to implement the laptop within their lesson plan. Common

themes developed out of the interviews I conducted with elementary school teachers.

These included professional development, classroom management, curriculum changes,

and laptop integration.

Professional Development

Many of the teachers interviewed expressed similar concerns about *how* to implement the

laptop into the curriculum.

> I had this conversation with my technology teacher—in our program,[7] we
> didn't learn how to teach students with laptops. When we first got into the
> classroom we felt really stupid; we had no experience with Apple
> computers. They should have Apples in our labs. I didn't like it—not
> knowing. I think they need to teach us how and when to use the laptops. I
> was told use them 10-40%--they need to tell us what should we teach on
> laptops, teach us how to integrate it in class. Like all of this
> sharing...those workshops are great, but ½ hour after they are done....I
> forget.....learn how to use them in a classroom (E1 teacher).[8]

This teacher's comments show that a classroom oriented form of professional

development would be a more effective way to ensure integration of the laptop. This

example also demonstrates a request from the teacher for more professional support of

the actual integration of the laptop into the curriculum. In comparison, another teacher

has been quite successful because the lead teacher in the school has come to participate

and team-teach new materials and practices with the laptop. I asked the question about

ongoing training and this developed from that question.

> *Is there anything on a regular basis that you explore?*
> In our cycle meetings, the only thing we discuss is laptops, and the
> principal is there and that is where she teaches us, the ELS teacher[9] and it
> is for the laptops.
>
> *How often does this happen?*
> It should be once every 2 weeks, but it has been once a month or 3 weeks.
> It is quite frequent.
>
> *No ongoing program after school, no regular program?*

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[7] Program refers to their B.Ed (Bachelor of Education/4 year program) program at University.
[8] Elementary school teachers are coded as E and number assigned to the teacher interviewed. Secondary teachers are coded as S and number assigned to the teacher interviewed.

[9] ELS teacher, Enhanced Learning Strategy Teacher; they are usually the lead teacher in the elementary school, who has been specifically trained to help with the laptops, a resource teacher for the school.

Usually every second Thursday after school for ½ hour our ELS teacher is amazing. I can go to her anytime and ask her and she helps. I have asked her can you come to my class? I would rather there be 2 adults in here, coping and running around. She helps me with things that I am not prepared to do, I am uncertain, but next year I will be. Let's see you do it and it is amazing. She has a time block of roughly 1 hour a day. If I am doing a project on ancient Greece, she researches websites for me; she gives me a few paragraphs saying what it is about so I can put it on my web site. She does things that I need help with and she helps the teacher that have less technical skills. She is helping teachers that are not as comfortable with the laptop, so she goes in their classroom and teaches their kids (E1 teacher).

The role of the ELS teacher [lead teacher] is similar to the "In-Classroom Collaboration" model that Gary Stager (1995) developed involving 1:1 laptop learning. By leading professional development within a teacher's own classroom some of the familiarity is retained and collaboration of another adult is often an inspiring process to a colleague (www.stager.org).

Classroom Management

This next example demonstrates a procedure that a teacher has put in place to help the students begin their day. She/he was descriging the Apple Cart[10] procedure:

someone [student] gets the keys from me [teacher] and they proceed from there; they may play on the computer until everyone is in the classroom. This motivates the students to get into their seats faster in the morning (E2 teacher).

Other Elementary teachers also said they follow daily routines to build in time-saving measures for classroom organization. The daily routine that starts the school day is part of the creation of the learning environment.

I just feel that for certain age groups the students are looking at the computer as a toy—they may not see it as something useful;

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[10] Apple Cart is the cart that the students store their computers on in the elementary schools when they are not using the laptops they can charge the laptop on this cart. The elementary teachers find that it is wiser to keep the laptops in the Apple Cart when not in use because of space limitations in the classroom.

Are you surprised by that? No, because they are kids, and in a way I think that they compare it to their Play Station and they get to play these games and do these things but that's all it is to them (E2 teacher).

This teacher is challenged by the student perspective about the laptop. Gary Stager would say, let the student learn—let her/him think it is a toy. As mentioned in the literature review, Gary Stager is an educator who is recognized on a global basis for his knowledge about 1:1 laptop learning.

Active Learning

On this day, student-centered [active] learning is what saved the day. Here is an example of student knowledge at work [one of the class visits for Showcase 2005].

On Monday, I had people come into my classroom and AppleWorks didn't work and so I had planned, to go to AppleWorks and 25 of the 29 students didn't have access to AppleWorks [server issue] and a student said to me Miss, we can do the same thing in PowerPoint—I said really, he said yes, so I said show me and he did! And I said perfect and we did. They teach me all the time—so I learn and they learn and that is a good experience for them and me (E1 teacher).

This example clearly shows the ease of communication that can develop between a student and teacher. The student was familiar with the two programs and helped solve a technical issue for the teacher. This teacher is aware that the learning that takes place in her/his classroom is a continuum for her/himself and the students. During the interview the teacher was excited to tell me that she/he learns from her/his students. This example also shows a paradigm shift in this teacher's practice. Stone Wiske, writes about shifting classroom practice from the "rehearsal of skills toward higher-order thinking, and independent inquiry" (2000: 72). This shift in thinking has already begun in this teacher's classroom.

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Comprehension and transitions

A majority of teachers sampled have noticed that students do not want to practice cursive writing because of the laptop.

> I find too that computers in grade 3—it is taking away from their cursive writing and they automatically assume when they cursive write...why am I doing this? Because of the laptop, instead they are doing their rough copy on computer. I hear comments about—why should I learn to cursive write when we are using laptops? These are some of the comments I hear (E4 teacher).

The laptop is new in the classroom for many students and teachers. Healy (1998) has done interviews with teachers who have laptop experience and she cannot get a consensus about which is better, to teach keyboarding or let them learn it on their own.

In these early years of elementary school spell-check is a tool that teachers have raised concerns about since it seems to undermine their [students] ability to spell.

> When they have laptops, they don't put their hand up as much because they go to spell-check, they see the first word on spell-check and they use that and they can't learn like that because they are not spelling out the word or writing it—it's the actual written part, that makes you memorize it, and they are making an assumption. Sounding it out is better, they are not reasoning it out at all, and they don't hear it, with spell-check (E4 teacher).

All of the elementary school teachers expressed concerns about spell-check. These examples about handwriting and spellcheck help us to see that challenges in the classroom are part of classroom management. These concerns have been expressed elsewhere. For example, Healy (2000) writes that a child should not be using technology in the classroom before the age of seven "when they develop the capacity to think symbolically and concretely" (in Westreich, 2000: 21). It is a question of developmental capacity, to be able to understand the experience and Healy (2000) does not want any educational experiences that would make the student resistant to further learning.

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According to Healy (2000) not enough research has been done in this area. This next example demonstrates a related comprehension issue.

Comprehension of what an icon represents is also a difficulty for younger learners. These are grade 4 and 5 students and some have had technology experience and some have not. Icons have presented as an issue with one teacher, here is a prime example of a comprehension issue;

> ....[...] another problem, they brought them [laptop] home, I would have at least 5 students who would say, kids would complain I don't have Power Point anymore, they would delete it [the program] and I need to talk to the technician about this, to see if they can block that, I'm sure that they can, the kids can actually delete programs, they argue that they didn't delete it, but it is not on the hard drive anymore. So, that would happen everyday [so this is an issue] not there so, then it is to the help desk and it created a lot of problems, like that and even just today, I had a kid say, he didn't have Word anymore, and I looked and yes, it was gone, and his assignments are lost, and things are gone. Yes, so it is a few days before it comes back, they think it is something to play with, they don't understand icons, I had a kid last week, they don't realize the importance of the icons, they think they are pictures. I had a kid last week who was trying to delete his hard drive, they don't understand, they didn't know they don't realize how things are important, they think they are just pictures (E1 teacher).

These problems related to cursive writing, spell-check, and comprehension of what a symbol represents on a laptop [icon] are some of the daily challenges that a teachers deal with in a laptop environment. These concerns are part of the 'instructional evolution' that Kleiman (2000) highlighted in his Apple study about classroom instruction levels. Kleiman reminds the reader that an 'instructional evolution' does not take place quickly, an evolution requires time for adjustment of teaching practices and changes in the learning environment (Kleiman, 2000).

Multi-tasking and socializing are not new issues in the classroom, yet the laptop

enables a social space to exist due to a common connectivity. I asked about discipline

issues. One secondary school teacher said:

> It is out of control—no, they finish their work early, they used to take out
> a book, now they are encouraged to go to a web site called Typingpal.
> They are pretty much sick of that—to improve their typing—they go
> check their e-mail. It is hard for me to check—you can have the main
> server at the front of the room, but you are supposed to circulate, and they
> bring up two screens and between them. They bring up two internet
> pages, they press F9 and they change to the next screen, they manipulate
> their screens [.........] the school has banned MSN Messenger, they are
> still getting to it through a web page, through MSN togo, I think that is
> what it is called. They find way around this, you are supposed to
> confiscate their computers.....(S2 teacher).

There are two issues in this example from a high school teacher—the students have found

a way to continue socializing with their friends during class time [MSN togo]. The

laptop creates a change in teaching practice, the circulating is now an activity done by

monitoring the students activity on the laptop during class. A physical circulating of the

teacher is now shared with the teacher's laptop via software surveillance.

The teachers want to maintain the attention of the student—engagement. The

students were open in showing this teacher how easy it is to manipulate the laptop screen

to be able to multi-task [during class]. In comparison to the elementary school,

challenges of questioning the importance of cursive writing, and having the ability to

comprehend what word to choose when spell-check is employed, or to know what an

Icon represents, the secondary students have discipline issues that teachers have noticed.

Even though the secondary students have the ability to comprehend they are now pushing

the boundaries of class time to explore the internet and socialize with friends, when from

a teacher perspective they should be working within the parameters of the assigned work.

November (2001) writes about engaging with the students in order to find a method to make this communication work in the classroom.

I asked teachers if the laptops had changed the classroom experience. Here are a few of their responses.

> It has changed it totally—I have to think; what do I do to get them to use the laptop, they read a book then sit down and ask questions—and we have to think of how to get them to do the responses [reading assignment] (E5 teacher).

> I think so. I think to be honest; I have really enjoyed having them in the classroom, it has been really fun to find new ways to learn with them, even with the Math, getting them to go on new sites, for them it is seen as a game, but for me it drill, drill, drill. Rather than here is a worksheet, and do this in your textbook. It is kind of like a reward for them because they are mastering it. They are mastering skills in a different way and it has changed their experience, and I know I am looking for different ways to help them to learn true technology because it is fun for me too [enthusiastic] we are learning everyday (E2 teacher).

James Moore, an instructional designer who designs educational web environments, is critical in his article "Don't Make Me Think! I'm Trying to Teach: Designing Web Environments that Enrich Teachers' Work" (2000). Moore focuses on the creation of useful web environments responding to teacher time constraints. What this elementary teacher is saying that she/he is not sure how to integrate the laptop into the lesson plan. The title of Moore's article shows a similar struggle for the teacher who is looking to integrate the laptop into the curriculum. This elementary teacher has expressed that she/he did not expect to have to think about a laptop in the classroom—it has changed her/his practice of teaching.

In comparison, look at a secondary teacher's experience from the student-centered perspective. It seemed to be more positive.

It allowed the students to explore more than if they would have left the classroom more and gone into the computer lab, they always have their computers right there with them, so if we are talking about a certain project and they have questions. I can put my lesson plan aside, and say, O.K. look it up for yourself, you tell me what you find. Which actually is nice because if they had to leave to go to the computer lab, there are only two computer labs in the school, there wouldn't be room for everyone, in that respect it is really nice, and that helped with lesson plans knowing their laptops are right there for them (S1 teacher).

This secondary teacher was focused on the student perspective and the active learning achieved. This teacher also looked at the logistics of the previous setup of going to the computer lab and enjoys the flexibility that the students have to push the boundaries of the classroom to find their own answers [active learning] instead of being led through procedures to find answers. These three examples demonstrate different perspectives— E5 teacher was teacher-centered, E2 teacher was able to see student and her own learning, and S1 teacher is student-centered.

Mark Goddard (2002) writes about changes in the classroom and the relationship of technology and curriculum reform:

Change may be icky, but educators who capitalize on the relationship between technology and education reform can help students develop higher-order thinking skills and function effectively in a world beyond the classroom. The achievement of such monumental change requires a transformation not only of the underlying pedagogy but also of the kinds of technology applications to be used in the classroom (Goddard, 2002: 25).

These three examples demonstrate the struggle within a classroom to integrate technology. Goddard (2002) writes that there has been too much focus on the "drill-and-practice format" of software that software developers have offered for classroom use. A blending of newer methods of practice as well as using viable educational software will

respond to the needs of society (Goddard, 2002) With the use of technology in the learning environment Goddard (2002) suggests that Teachers teach for the future and adapt to change to prepare the students for the world outside the classroom.

The teachers in this research study exemplify what Wotherspoon (2004) states from a critical perspective: school is not simply about formal learning it is also about informal and social dimensions. The addition of a laptop opens a parallel option of learning that creates a new flexibility in learning and pushes the boundaries (access to information via internet) of a learning environment. The pushing of boundaries is new to this group of teachers and this creates a transition as a professional issue. This multi-functional approach to education (laptop integration, curriculum reform, and adjustment to changes in teaching practice) is about the process of the creation of the individual self— (*individuation*) the construction of an identity linked to the ideology that we are *distinct subjects* (Wotherspoon, 2004). Personal development is related to the perspective that school is a more than a classroom. Posner (1995) believes that there are five categories of curriculum:

1. the Official Curriculum (that which needs to be known and is prescribed)
2. the Operational Curriculum (the actual teaching practices within a school)
3. the Hidden Curriculum (the institutional norms and values not openly acknowledged)
4. the Null Curriculum (the subjects not taught)
5. the Extra Curriculum (planned experiences that exist outside the official curriculum) (Posner in Goddard, 2002: 22)

These categories of curriculum provide an insight into a small part of the role a teacher maneuvers on a daily basis. When the curriculum is tied to the integration of a

laptop this adds another layer of professional challenge for the teacher. The pushing of boundaries is tied to the internet access a laptop provides to the learning environment; an interactive forum of learning. Al November (2001) has placed an emphasis on the use of the internet and technology in schools to produce informed communication of a global perspective; to expand the classroom walls and explore the good and the bad that exist through the internet. November (2001) stresses the importance of critical analysis for the teachers and students to develop knowledge. Teachers and students will be able to communicate and explore subject areas over the internet. November (2001) has written that networking and collegiality will build a base of wisdom that can be transformed into a broader learning environment.

Secondary School Teachers

There are a few issues that pertained specifically to secondary school teaching practices. The teachers in their final practicum had had no experience within their B.Ed. program in using Apple computer equipment. This teacher expressed her point of view about the Apple iBooks.

> I was not at ease with Apple [laptop]—I prefer my PC. I find the setup of the Apple complicated (S1 Teacher).

In the example above, although the teacher was unfamiliar with the laptop it was a challenge rather than a deterrance. It was also a challenge for the host teacher.

> *How about your host teacher at school? How have they adapted to the laptop in the classroom?*

> Slowly, yep, my host teacher has been teaching for 41 years, so, she hasn't adapted so well to the computer and now they are having all these different workshops, and she is so happy and she is able to learn and the kids are doing all of these things, and I don't understand, so now she is starting to pick up on them as well.

So during this timeframe there are a lot of workshops being given?

Yes, every Tuesday (S1 teacher).
This example demonstrates that not all of the teachers have adapted easily to the laptop. It also reflects Kleiman's (2000) conclusion that there is an "instructional evolution" that takes place in a computer based classroom. These teachers are at the "entry stage" where there is a mixture of excitement and trepidation.

Classroom Management

Another area of concern for secondary teachers is the multi-tasking that students are able to do with the computers during class time, especially when it is unrelated to course content.

> MSN Messenger has been banned—but they still go and get it on MSN togo web site (S2 Teacher).

> Like during recess, they play games, you have to watch them all the time, because they try and play games during class or go on their MSN and chat with their friends, you have to constantly watch them, you have to make sure that they are using them for what they are supposed to be (S1 teacher).

> *And how do you find out with 21 of them? [if they are on an appropriate web site]*
> It's difficult, we have a special program online, on the laptops that the teachers have that we can actually look to see what they are doing on the laptop, so that is very handy once you actually figure out how to use it and you can see this even from the staff room, so that you have an idea of what they are doing, to look for, to watch and that helps out; and you can freeze them, as soon as they realize that you are watching them, they usually close down, or you can send them messages, telling them that you are on a site that you are not supposed to be. Oh, yes, it usually only takes one person to say the teacher is watching, so she knows what she is doing (S1 teacher).

Technology, especially chatting with friends and e-mail, are areas of socialization that students have had access to in their homes prior to laptop integration in schools.

November (1998) instructs teachers to communicate (collegiality) with each other about technology use and what is and is not working for them. Students who are not disciplined about completing their assignments may risk disciplinary actions. Teaching practices will also evolve with the integration of technology and reformed curriculum (Goddard, 2002).

Showcase Conference 2005

At the April 2005, Eastern Townships Educational Foundation[11] *Showcase* a group of conference delegates (myself included) traveled to Massey Vanier High School in Cowansville, Quebec to observe how laptops are used in the classroom.

The student reality of using a laptop at the Massey Vanier High School (visited during *Showcase* conference) was different than the reality reflected in the interviews I conducted. The key difference appeared to be lack of technical support for the laptops at the Massey Vanier High School.

A *Showcase* delegate visiting the class asked the students if they would give up their laptops: 2/3s of them said yes, they would. The students found that the lack of technical support as well as the difficulties with the hardware itself, often put them at a disadvantage when using laptops during class. These students did not see the need of introducing a laptop in the last year of high school when they are working towards their future educational prospects (CEGEP and university). A core group of these students agreed that they would be happy to have the teacher use a projector and her laptop to explain class assignments.

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[11] The Eastern Townships Educational Foundation was set up to raise money for the continued success of the integration of laptops into the ETSB.

The assignment they received when we were there was to break up into pairs or groups of 3 at the most and design a presentation about a concept that they had studied in Moral and Ethics class this year. Before beginning their project, the group would present their idea and method to the teacher. We asked the teacher how much time she had assigned for this project and its value or percentage of the year's mark. The teacher told us the students would have 3 weeks to complete their assignment and that it had a value of 50%.

The Principal invited the delegates to an auditorium after we had visited several classrooms and the computer help desk. He described how the laptop program was doing and his hopes for the future. The Principal outlined a vision to create a culture of laptop users and technically adept students and teachers who will be competitive in the world market. A question was asked about the structural implementation of the laptops and if the school board had it to do again whether it would proceed in the same manner. The Principal said, no, it had not been a wise process to introduce the laptops into the Level 5 first and not the other levels. The laptops were introduced over a 3 year period into different grades (elementary) and in the high school starting with level 5. Levels 1, 2 and 4 received their laptops in the fall of 2005.

The Principal was asked why level 5 first? He explained it was done from a Public Relations point of view. These are the students who are going out to further their education, the school board decided exposure to the use of a laptop would be an advantage to the students entering CEGEP. The Principal was also asked if the board should have reconsidered giving the laptops to the Level 5s in the second year of implementation, his answer was simply "no, you cannot go back."

The school does have a help desk with a technical assistant who reports to the Principal and the technician's mission is to keep all of the machines running. At the time of the Conference there was only one student helper for the help desk. One issue that had been mentioned during this conference is that the ETSB have increased the number of technicians this year to provide a better service to schools. The help desk is also staffed by students who are trained by the technician to do the simple verification of the laptops when there is a difficulty with them.

During the *Showcase* Conference there were students present who interviewed conference delegates to make a DVD about the *Showcase* Conference from the student perspective [this was also a way for the ETSB to know the interest of the conference delegates].

As part of the *Showcase* conference, I attended a workshop about Professional Development that the teachers had been involved with since the laptop integration. This workshop was a Power Point presentation that highlighted three key themes of: Familiarization, Use Applications and Integrate into Curriculum. The three main aspects were broken down further into subcategories. One is of particular interest here: What we Learned[12].

What we Learned:

> 1) True integration takes time
> 2) Integrating effective technology use often requires a change in teaching practice
> 3) Resistors often need the most help learning how to use and integrate
> 4) Never lose sight of the goal of improved student achievement. (*ShowCase 2005*).

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[12] For a full exploration of this Power Point presentation see Appendix C.

The Eastern Townships Educational Foundation (ETEF) has the role to raise funds to enable the funding required for the laptop integration. The ETEF exemplifies the link to the business world that is entwined with the Enhanced Learning Strategy. When attending the *Showcase* Conference, I spoke with a school board official about the funding of the laptop strategy. This official explained the unique situation that the ETSB is in. The school board has taken out a loan approved by the province to honour the yearly leasing contracts with Apple Canada. The ETEF has a mandate to raise funds for the ETSB such as scholarships, improvements projects and the Enhanced Learning Strategy. A project of this depth is not covered by school operating budget. Before the school board decided to request a loan option the Director of the ETSB Ron Canuel, applied to several large U.S. foundations and was unsuccessful in securing funding. U.S. foundations support U.S. initiatives; there is a lack of such foundations in Canada (*The Record*, May 5, 2005).

During the *Showcase* Conference, the Principal echoed Al November—build a culture of technology and learning. There were two business-like statements to note: the Principal's claim, it was a public relations decision to have the Level 5 students be one of the first cohort to use a laptop and his statement "no you can't go back". The latter showed a lack of flexibility on the management of the Enhanced Learning Strategy and the former shows the business hiearchy that has settled into the school system.

CHAPTER FIVE

Conclusion and Recommendations

It is clear that the transition to a laptop learning environment is a smoother transition for the student than the teachers involved in this study, especially the elementary students. The elementary students were fully engaged in the visual aspects especially iMovie. The high school students, on the other hand, were not that interested in using the laptop. When commenting on this difference, the Principal at Massey Vanier argued it was important to build a culture of technology learners but readily admitted that plunking a laptop in secondary five was not a good idea. The students had had no support previous to that year and just wanted to finish their high school education and move on.

While the grade 11 students that I interviewed did eventually get interested in the use of the laptop to them it was viewed as a way to accomplish their projects. One high school student liked the organizational factors for the ease of working wherever he was and the laptop helped him organize his CD collection. Another used the laptop to support a website for a charitable foundation, this same student had another computer at home besides the laptop, so her/his previous technical experience was well developed. He/she also expressed liking the portability feature. These students are using the laptops at home and school blurring the lines between school work and home use. Thus, a "slippery identity" has developed from this blending of components (Facer, Furlong, Furlong and Sutherland, 2003: 55).

There are challenges for the student and teacher regarding discipline of use of the laptop while in school. These challenges could be met with changes in teaching practices

and some have already found methods to deal with students' inattention while being given an assignment. At the elementary level there are clear sanctions, at the secondary level the self-discipline is encouraged and some teachers are aware of the wandering attention issue.

I cannot generalize about each teacher's classroom experience. As November (1998) argues, a teacher can collaborate on lesson planning and then integrate the lesson using passive methods of teaching practice thus disabling the laptop and turning it into nothing more than a glorified claculator (automating versus infomating laptops). There were varied classroom experiences: some were using automating and others infomating techniques. The lack of Professional Development or training was often acknowledged. Many teachers wanted more directives about the amount of time they should allocate for the use of the laptop during the school day. At the elementary level the teachers wanted the students to have routines. Under Classroom Management one teacher created an Apple Cart procedure as a way to motivate students to "get into their seats faster in the morning". Time was always viewed as a challenge, in particular not having enough time to cover or explore the required course material set out in the curriculum. Not only does the curriculum identify the necessary objectives throughout a daily and weekly basis, it also involves constant evaluation, thus adding to the time pressures the teachers experience.

A blanket generalization cannot be made about learning with technology because everyone learns at different rates and personal experience is a bonus. Some of the teachers are adapting to the laptop without too much difficulty and finding ways to use it well in the classroom. At the elementary level, for example, one teacher prepared a

handbook for the *Reading Response* that was part of the curriculum and she/he presented

it in two workshops within the schoolboard. This example demonstrates an innovative

form of collegiality combined with professional Development. A few high school

teachers have demonstrated a shift in their teaching practice as well, by having the class

listen to the assignment before everyone opens their laptops, thus avoiding the

unnecessary questions of first project by preparing the class with clear directives from the

beginning of the assignment and at the same time developing listening skills.

Other teachers will need more time. Some of the student teachers said their host

teachers were having difficulty adapting to the use of technology within the classroom.

One of the issues seems to be that integration of technology takes more time than is

anticipated. This was also one of the key lessons revealed at the Professional

Development Workshop that I attended at the *ShowCase 2005* conference.

As for the classroom experience of these teachers, the answers that they provided

support what I have just stated that the experience is individual and this presents a

challenge for those who are presenting the Professional Development. Some teachers

expressed the correlation of respect for equipment would run off into respect for their

fellow classmates. One teacher expressed her/his classroom experience from her/his own

point of view, another could see both sides of the coin [her/his own and the student

experience], and the other teacher looked at a student-centered experience.

A common theme that surfaced was the lack of training or Professional

Development provided at the undergraduate level involving use of technology in a

classroom. My first recommendation is that a stronger liaison between the closest

teaching university and the school board be developed [13]. The Enhanced Learning Strategy could be twinned with many undergradute programs to develop meaningful teaching practices, educational software as well as fostering a sense of collegiality that is necessary within a technological project of this scope. This is an ideal opportunity to tackle the present challenges that have developed within this Enhanced Learning Strategy.

A common underlying assumption (by the public) is that young people will adapt easily to technology and they will adapt once they settle into a classroom. If the technology and teching practices are not taught at the undergradute level then the student teacher is uncertain of how to use their own teaching practices. The viewpoint that constructivist methods and, active learning methods are good choices when using technology has been reviewed in this research. It is also important to remember that it is the blending of the older methods (passive learning) with the newer methods (constructivist, active collaborative learning) that will strengthen the evolution of the learning environment.

Yet, again, another viewpoint could be that Lifelong learning, as I discussed in the Background information, is a factor for these teachers. These and other teachers will need to embrace a spirit of adaptability to enjoy a classroom experience.

Posner (1995) argues that there are many forms of curriculum, what teachers need to know, the actual curriculum, values and institutional norms, subjects that are not taught, and experiences that just spontaneously occur. The curriculum dictates the

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[13] Bishop's University is the closest University with an Education undergraduate degree. Concordia University has an Educational Technology component to their Education undergraduate degree. These are two possible options for integration of newer methods of teaching practice.

limitations or boundaries of learning experience to teachers, yet this too is open to teaching practice. Internet access will open more experiences via communication and the growth of teaching practice by integrating collegiality with other Lifelong learners in the field of Education.

This Enhanced Learning Strategy is at the early stages of implementation, the director of Pedagogy of the schoolboard stressed during the Professional Development that a technology integration takes time. This study was undertaken to explore the social challenges of laptops in the learning environment. While looking at the addition of a laptop to a classroom the research has certainly produced many interconnected aspects of such a project.

Professional Development for the teachers of the ETSB is evolving; this again is, a place to begin a transition. A second recommendation is that new teachers coming into the ETSB will need more support in a laptop classroom, because this involves new methods of teaching practice.

Without the digitization that began in the mid '90s as a recommendation and an action of the neo-liberal government this project may not have occurred at this time. Cutbacks in the field of education have forced the schoolboards to court the corporate world (consumer society) in search of funds to realize such a major technological project. Another thesis could be written about whether corporate and consumer society influences will or will not make a difference in the schools themselves. The schoolboard is doing damage control to reassure parents that the corporate influence is limited; this has been seen in the local media. Apple Canada does not supply the laptops free of charge, as stated in the *ShowCase* 2005 section, the laptops are leased. The government sanctioned

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the ETSB to take out loans to meet these leasing payments. Loans need to be paid, after attempts by the Director General to raise funds for the ELS it was decided that a foundation, the ETEF, was needed to raise these funds. There are not as many granting agencies and resources in Canada as in the United States.

This Enhanced Learning Strategy appears simple when you first read about adding a laptop to the classroom but upon researching the related literature and performing the interviews many issues are clearly in a state of transition. What was made clear was that the main goal of student achievement is uppermost on the agenda of the schoolboard followed by giving the students communication and technology skills. The social challenges of a reformed curriculum, time constraints, transitions in teaching practice and a lack of funding have not deterred or inhibited the integration of laptops in the learning environment. The largest challenge remaining is whether the use of a laptop in the learning environment will be a meaningful experience or an expensive tool.

References

Armstrong, S., & Warlick, D. (2004, September). The New Literacy.

http://techlearning.com/ retrieved July 19, 2004.

Breck, J. (2002) *How We Will Learn in the 21st Century*. Scarecrow Press, Boston, MA.

Brewster Academy, Wolfeboro, NH. School Design Model

http://www.brewsteracademy.org/Pages/Information/about_brewster.html

retrieved May 5, 2004.

Canadian Federal Government Web site to create connectivity via the internet

http://www.schoolnet.ca/home/e/ retrieved July 18, 2005

Covaleskie, J.F. (1993) http://www.synaptic.bc.ca/ejournal/foucault.htm then click on

"Power Goes To School: Teachers, Students and Discipline"

http://www.ed.uiuc.edu/EPS/PES-Yearbook/93_docs/COVALESK.HTM

retrieved July 11, 2005.

Cruikshank, B. (1993). "Revolutions Within Self-Government and Self-Esteem",

Economy and Society 22 3, 327-344.

Di Sessa, A.R. (2002). *Changing Minds, Computers, Learning and Literacy*,

MIT Press, Cambridge, MA.

Enhanced Learning Strategy (2003). http://www.etsb.qc.ca retrieved July 20, 2004.

Fink, D.L. (1999). Active learning.

http://honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/acti

ve.htm

Reprinted with permission of the University of Oklahoma Instructional

Development Program, July 19, 1999 Retrieved June 1, 2005.

Fitzgerald, Leah (May 5, 2005). "ETSB fundraising campaign in 'silent phase'

The Record.

Foucault, M. (1995) *Discipline & Punish – The Birth of the Prison*

Second Vintage Books edition, Random House, Toronto, Canada.

Gardner, H. (2000) "Can Technology Exploit Our Many Ways of Knowing?".

In D. T. Gordon (Ed.) *The Digital Classroom; How Technology is Changing the*

Way we Teach and Learn.

Goddard, M. (Fall 2002) "What Do We Do with These Computers? Reflections on

Technology in the Classroom." *Journal of Research on Technology in Education.*

Gooden, A.R. (1996). "Bringing Biology to Life" and "The Computer Greenhouse

Effect" Jossey-Bass and Apple Press Pub. *Computers in the Classroom*

U.S.A. 35,1.

Government of New Zealand. What is the Knowledge economy?

http://www.med.govt.nz/pbt/infotech/knowledge_economy/knowledge_economy-

04.html (World Development Report, 1999). Retrieved August 1, 2004.

Healy, J. (1998) *Failure to Connect*, Simon & Schuster, New York, NY

Henrico County, VA "One-to-one Computing" http://main.edc.org, June 2004

PDF, Teaching & Learning (ibid) retrieved July 20, 2004.

Kemker, K. & Barron, A. E. (2004) "Laptop Computers as a Tool for Authentic

Instruction" National Educational Computing Conference, University of South

Florida, Tampa, FL

"No Strings Attached" web site mentioned in the Kemker article

    http://www.trainingcafe.com/macromedia/leaders/profile_k_kemker.cfm

    retrieved July 19, 2004.

Kleiman, G. (2000). Apple Myths. In D. T. Gordon (Ed.) *The Digital Classroom; How*

    Technology is Changing the Way We Teach and Learn.

Maine Learning Technology Initiative; Report by: Silvernail & Lane (2004)

    http://www.state.me.us/mlte/ *The Impact of Maine's One-to-One Laptop Program*

    on Middle School Teachers and Students, retrieved March 20, 2004.

Media education in Canada (click on teacher index) www.media-awareness.ca

Milliron, M.D. & Miles, C.L. (November/December 2000). EDUCAUSE review

    Education in a Digital Democracy Leading the Charge for Learning about, with

    and beyond Technology http://www.educause.edu/apps/er/index.asp

    Retrieved July 4, 2005

Moore, J. (2003). "Don't Make Me Think! I'm Trying to Teach: Designing Web

    Environments that Enrich Teachers' work." In D.T. Gordon (Ed.) *Better Teaching*

    and Learning in the Digital Classroom

Nettleton, S. (1997). "Governing the risky self. How to become healthy,

    wealthy and wise" *Foucault Health and Medicine.* In A. Petersen and R.

    Bunton (Eds.), New York: Routeledge, (pp. 189-206).

November, A. (1998). *Creating a New Culture of Teaching and Learning.*

    www.anovember.com/articles/asilomar.html retrieved July 18, 2004.

November, A. (2001). *Drill the Teachers, Educate the Kids.* (article provided on a CD in

Education class; Summer 2004). www.novemberlearning.com/ retrieved July 18, 2004.

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Peim, N. (2001). "The history of the present: towards a contemporary phenomenology

   of the school" *History of Education*, Vol. 30, No. 2, (pp. 177-190).

QUESN-RÉCIT stands for Quebec English School Network - Reseau de personne

   resources pour le développement des Compétences des élèves par l'Intégration

   des Technologies (2001) Quebec Reformed Curriculum

   http://www.qesnrecit.qc.ca/reform/wraa/ retrieved August 10, 2005.

Rose, N. (1996). "Introduction", "How should one do the history of the self",

   Inventing our selves' psychology, power and personhood, New York: Cambridge,

   (pp. 1-40).

Stager, G. "In Australia...Laptop Schools Lead the Way in Professional Development" in

   Educational Leadership – October 1995

   www.stager.org/articles/edleadership.html retrieved, October 2, 2005.

Statistics Canada, The Daily (2002). Youth in Transition Survey, report #14

   (81-595-MIE2004014)

   http://0.-ww.statcan.camercury.concorida.ca/Daily/English/040405/d040405a.htm

   retrieved June 2004.

Taylor, A. (2003). "Position and Privilege Adding Value to the High-School Diploma"

   Power and Resistance, Critical Thinking About Canadian Social Issues, In L.

   Samuelson and W. Antony (Eds.) 3rd ed., Fernwood Publishing, Halifax, N.S.

Webster, F. And K. Robins (2004) "The Long History of the Information Society" in

   The Information Society Reader ed. Webster, F. Et al., Routledge: London

Westreich, J. (2000) "High-Tech Kids: Trailblazers or Guinea Pigs?" In D. T. Gordon

(Ed.) *The Digital Classroom; How Technology is Changing the Way we Teach*

and Learn.

Wiske, S. (2003). "A New Culture of Teaching for the 21st Century"

In D.T. Gordon (Ed.) *Better Teaching and Learning in the Digital Classroom*

Wotherspoon, T.(2004). The Sociology of Education in Canada, Don Mills:

Oxford University Press.

Information Highway Advisory Council, (1997) *Preparing Canada For A Digital*

World. Industry Canada. Ottawa, ON

Appendix A

Consent Form to Participate in Research

I Barbara Hunting am conducting research into the use of laptops in the classroom. I would like to interview your child to learn along with them about their experience with their laptop computer.

The interview will take approximately 30 minutes. Your child's identity will be protected throughout the research process. The data from this study may be published. This is not an ongoing study and I will interview your child one time only.
The interview will be digitally recorded to provide the researcher and participant a conversational flow of ideas during the interview.
The information will be kept confidential between the researcher and the participant.

_____

Parent's signature

_____

Participants name (print please)

_____

Barbara Hunting/researcher

_____

Date

[student]

Consent Form to Participate in Research

This is to state that I agree to participate in a program of research being conducted by *Barbara Hunting* of the Sociology and Anthropology Department of Concordia University.

1.   Purpose
I have been informed that the purpose of this research is to explore my classroom experience with laptops in the learning environment.

2.   Procedures
The interview will take approximately 30 - 45 minutes.   The interview will be digitally recorded to provide the researcher and participant a conversational flow of ideas during the interview.

The information will be kept confidential between the researcher and the participant.

3.   Conditions of Participation

- I understand that I am free to withdraw my consent and discontinue my participation at anytime without negative consequences.

- I understand that my participation in this study is confidential (the researcher will know, but will not disclose my identity).

- I understand that the data from this study may be published.

I HAVE CAREFULLY READ THE ABOVE AND UNDERSTAND THIS AGREEMENT.
I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

Name (please print) _____

Signature _____

Date _____

Researcher's Signature_____

[Teacher]

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Grade 5 & Grade 11 Questionnaire

What do you do with your laptop in the classroom?

Depending on what they say.....I lead into questioning on actual subjects, Language Arts, French, Projects

How do you hand in your work?

(This gets into how the teacher's comfort level with the technology, either a paper copy, or handed in to a specific folder)

What was the first thing you learned on your computer?
(this will bring out shortcuts, teacher's ability to communicate them)

Is there a favourite (s) project(s) that you have done? Or maybe different projects?
(Some of them are quite eager to open up a project and show it to you at this point, others would rather talk about it.)   .

(this question comes back repeatedly, because they have access to media as well as writing projects)

At this point, (if they haven't already done so) get them to open their laptop, talk about their screensaver (if they are using one), see if they will show you around the computer without too much intervention.....

What do you do with your laptop at home?

Teacher Questionnaire

Please state your name (s)

What is your teaching experience?

Are you using laptops right now?

So they are implicated in every subject?

Do you have an advisor at school ?

Do you own a laptop? ..... is one provided for you at school?

Give me some examples of what you do with the laptop?

Their assignments do they print them? [Probe; Or do they send them to you virtually?]

Any labs, at the school so they can do research?

What type of research do they do at this level ?

What are they accessing?

How many students do you have in an average class?

How do you find that to manage?

Have you had any discipline issues?

Tell me about repairs ?

Do you think that your program at Bishops prepared you for this classroom experience?

Did you have any special training to use the laptop in the classroom?

Do the students use backpacks or briefcases?

Have there been any incidences of RSI [repetitive strain injury; writst] or injuries due to computer use?

Has the laptop changed your classroom experience?

Appendix B

This example of evolution in learning is a prime example of how students who actively engage in learning are more efficient in the production of their own knowledge set and are able to become lifelong learners.

Here are the transitioned 3Rs →4Es;

Reading → Exposing Knowledge: having access to the internet can pose potential difficulties in the verification of sources therefore it requires a skill set of reviewing and decoding information. First you find the information, this requires the ability to identify the needed information, the use of web search tools and learning to use the best and most efficient search engines or strategies to expose the desired information. Secondly, decoding or reading for a deep meaning—researching the content. Thirdly, being able to identify and evaluate the necessary information to reach the desired goals. Finally, when you are researching and retrieving information it is vital to stay organized so retrieval is efficient; i.e. building a personal digital library—there are sites that host this service of storing relevant bookmarks etc. for individuals.

Arithmetic → Employing Information: Information is expressed numerically and personal computers can help individuals to interpret and produce data, by analysis or manipulation, thus improving the process on the path to achievement. What is needed as a skill set are the following; Basic mathematical skills—including the comprehension of the fundamental laws of numbers, concepts, problem-solving to reach goals. Secondly, know the basics of computer-aided processing of numbers—be able to use a spreadsheet and manipulate data processing tools. Finally, process media—know the basics of

working with digital cameras, scanners, MIDI music devices and make use of the multimedia content available on the Web. Know the software to be able to process and give value to information.

Writing→ Expressing Ideas Compellingly: In the information age "content competes for our attention in much the same way as products on a store shelf were designed to in the industrial age" (techlearning.com). It is vital that students, firstly, learn to write effectively and are able to communicate using text. Secondly, communicating with multimedia means learning to use the right tool of communication to reach the audience.

Ethics→Right and Wrong on the Information Highway; as the importance of information increases within the culture and economy, power becomes an issue. Students need to learn about the ethical use of information as well as acquiring information skills. Firstly, information reliability; when exposing knowledge students need to learn how to assess the accuracy of information. Secondly, information property; information needs to be understood as property and that means that anyone has the ability to be producer of knowledge. Information needs to be treated in the same way as material property. Finally, information structure; computers are part of networks—information flows no less than how "we depend on roads, rails, waterways, and airports" (www.techlearning.com).

Warlick and Armstrong (2004) note that the seriousness of planting a virus is as destructive as blowing up a bridge.

While the basics of education are the same—the tools that are required for the decoding of the content are more communication oriented. The reformed curriculum is a

development of human capital skills. The emphasis is on the development of communication, interaction and the production of knowledge.

Appendix C

Professional Development workshop given at ShowCase 2005

1 Professional Development
- The Key to Success

2 The right PD for teachers is essential for students to adopt the types of laptop uses that lead to improved achievement.

3 Three Aspects of a Professional Development Program

4 Challenges
- A few teachers were true beginners
- Most teachers had not used a laptop
- Most teachers were not familiar with the Mac system

5 Familiarization
- Teachers receive [laptop] well before their students
- Show basic operations
- Set expectations

6 Applications
- Develop and improve comfort level with most common uses
- Word, Internet searching for beginners
- Excel, photo and Movie for advanced
- File Management
- Learning context is always a classroom situation

7 Applications training Schedule
- Compulsory summer Institutes
- PP Day workshops
- In-school mini-workshops
- Consider ability level
- Ongoing

8 Integrate into Curriculum
- Teachers need to be comfortable with the technology first
- Target specific curriculum areas
- Lead to change in teaching practice
- Emphasize technology use supports improved learning

9   On-going support
■   ELS teachers
    -   Lead pedagogical role in each school
■   Apple Trainers
    -   220 days in our contract
    -   work on integration with teachers in their classes
■   Collaba forums, Share-Fair etc.

10 Integrate into Curriculum #2
■   Long term; sustained through multiple workshops
■   Wireless Writing and Response
■   Math and excel at elementary
■   Media Literacy at all levels
■   Inquiry - PBL (Project Based Learning) at Secondary

11 What we Learned
■   True integration takes time
■   Integrating effective technology use often requires a change in teaching practice
■   Resistors often need the most help learning how to use and integrate
■   Never lose sight of the goal of improved student achievement

Appendix D

A first choice methodology was to interview Teachers and School Administrators to see if the implementation of the laptop in a classroom would have an effect on the learning environment. Second, I proposed to perform classroom observations in grades 5 and 11 to support the questionnaires of the teachers and school administrators.

I met with the Public Relations Director of the Eastern Townships School Board (ETSB) in the Fall of 2004 to begin the process of entry into the desired field of study. The Public Relations Director was very receptive to my proposal. She informed me that the next step would be to meet with the Director of Pedagogy of the Eastern Towships School Board. I met with the Director of Pedagogy of the ETSB in November of 2004. The Director of Pedagogy asked me many questions concerning my research and then he made comments about my research design. The Director of Pedagogy was not receptive to the project that I wanted to undertake. Nevertheless, he said that he would present my project to a meeting of the Principals of the school board that was scheduled within the next week and would have an answer for me after that meeting. I received an e-mail a few days later from the Director of Pedagogy stating that my proposed research had no real value to the school board and I would not be granted access to any classroom observation or the possibility to interview teachers or school administrators.