WHAT ARE THEY DOING AND HOW ARE THEY DOING IT?

RURAL STUDENT EXPERIENCES IN VIRTUAL SCHOOLING

by

MICHAEL KRISTOPHER BARBOUR

(Under the Direction of Drs. Thomas C. Reeves and Janette R. Hill)

ABSTRACT

This study examined the nature of virtual schooling in Newfoundland and Labrador secondary education. The primary goals of this research were to investigate the virtual school learning experience for students in the Centre for Distance Learning and Innovation (CDLI) including the kinds of support and assistance most frequently used and most valued by students learning in a virtual environment.

Data were collected related to what students did during their asynchronous class and synchronous class time, along with where they sought help when they needed content-based assistance. Students were interviewed and observed during their virtual school class time. In-school teachers were interviewed and e-teachers were also observed. Data were analyzed using the constant comparative method utilizing *Microsoft Word*® as a tool for qualitative data analysis.

Findings indicated that during their asynchronous class time students were often assigned seat work or provided time to work on assignments, however, students rarely used this time to complete CDLI work. When the students required assistance they usually relied upon their local classmates. If peer support was not successful, they turned

to their e-teacher if it was during synchronous class time or if they had the time to wait for a response. If it was during asynchronous class time or if they needed more immediate feedback, they would seek out their in-school teachers. Students rarely used most of the support resources provided by the CDLI.

Further research is needed to improve asynchronous teaching strategies exhibited, to better understand the virtual school experience of lower performing students, to improve upon the identification of students who will be successful in and provide remediation for students who are weak in certain characteristics, and finally to investigate how e-teachers and in-school teachers encourage greater interaction and sense of community to allow students to learn in the social process from their more capable peers. As the goals of this future research are to impact the practice of virtual schooling, design/development research may be a suitable methodology for these future studies.

INDEX WORDS: virtual school, virtual high school, K-12, online learning, web-based learning, small school, rural, rural education

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DEDICATION

To my wife, Lisa.

You began this four year journey with me within a month of beginning our life together.

Your love and support have sustained me during this time.

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I am eternally grateful to my two co-chairs, Drs. Thomas C. Reeves and Janette R. Hill. You accepted me as your student after my first year and have provided guidance, support, and wisdom ever since. Your sense of humor and willingness to let me chase tangents, Dr. Reeves, have contributed to my development as a professional. Your nurturing and mentorship Dr. Hill, gave me a safe environment in which to grow. My other committee members, Drs. Lloyd P. Rieber and Todd Dinkelman, who asked me the difficult questions to push my own thinking.

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Chapter 1: Statement of the Problem

Cosby and McDermott (1978) indicated that there was a perception that those living in rural areas represented "a small and insignificant segment of the population" of the United States (p. 6). The authors speculated that this was due to the urban dominance in matters of politics and commerce, along with a general shift in the population from rural to urban areas. These observations are still relevant almost thirty years later and are applicable not only to an American context, but in most rural jurisdictions. It is particularly true of the Canadian province of Newfoundland and Labrador, which is located on the east coast of Canada. The province, which has both an island and mainland portions, has a total area of approximately 252,000 square miles and a population of a little less than 510,000 people. Although about half of the population resides on the Avalon Peninsula or within a 100 mile radius of the provincial capital, St. John's, the remainder of the province is sparsely populated. In fact 192 of the 294 schools in 2004-05 were located in these rural areas (Government of Newfoundland and Labrador, 2005), 85 of which were designated as necessarily existent (i.e., a term used to describe schools that cannot be closed because they are located so far from another school that it makes bussing the students not feasible due to distance[1]).

[1] This term was first used by the Minister of Education in March 1999, when 93 schools were designated as necessarily existent or small schools. There are now only 80 necessarily existent or small schools for the 2006-07 school year, as school construction in strategic locations has meant that some of these schools were no longer too far away from another school to be closed (H. May, personal communication, October 30, 2006).

As with rural jurisdictions across North America, many of the schools in Newfoundland and Labrador do not have enough teachers and are unable to provide sufficient variety in the course offerings required by the provincially-mandated curriculum. In this environment, rural schools are unable to offer their students the same level of educational opportunity as their larger, urban counterparts. Since the late 1970s, the Government has published reports outlining these problems (e.g., Crocker, 1989; Crocker & Riggs, 1979; House, 1986; Riggs, 1987).

Based upon the recommendations of Government reports, the province implemented a program of distance education for rural high school students in September 1988. The main purpose of the program was to provide secondary level students with courses that were important for post-secondary admission but that were difficult to offer in rural schools due to low levels of student enrollment. During the 1989-90 school year, 38 of the 548 schools in the province had fewer than 25 students (Government of Newfoundland, 1990).

In its first year of operation, the Newfoundland and Labrador distance education program consisted of just one course: Advanced Math 1201. This Telemedicine and Educational Technology Resources Agency (TETRA) distance education program utilized an audio-graphics system (sometimes referred to as a telematics system). Using the TETRA distance education program, students would spend 50% to 80% of their instructional time using this synchronous distance education system and the remainder of their time completing correspondence-style work which was submitted using a fax machine.

Over the next three years, additional courses were developed until the entire advanced mathematics curriculum was available. Following the release of a series of Government-sponsored reports (i.e., Crocker, 1989; Williams, 1993), the program was again expanded to include the complete physics and chemistry programs and upper level French as a second language courses. Over a period of twelve years, the program grew from an enrollment of 36 students from 13 rural schools in a single course to 898 course enrollments in 11 courses, representing a total of 703 students in 77 different rural schools by 1999-2000 (Brown, Sheppard, & Stevens, 2000). However, there were still calls from Government-sponsored reports for a more comprehensive distance education program (i.e., Williams, 1993). One of the reasons for needing a more comprehensive approach was outlined by Mulcahy (2002) when he indicated that this current system of distance education "demonstrated that many students taking distance courses required and received a significant amount of pedagogical assistance with 'matters of content' from school based personnel" (Classroom Teachers: A Mediating Role, ¶ 5). Brown et al. (2000) also outlined another reason when they described how school administrators, teachers, and even parents were well aware that students enrolled in distance education needed to be successful academically, possess self-discipline, have academic ability and have demonstrated that ability in class, and be prepared for extra independent work. The distance education program in place at that time could not accommodate students who did not possess these skills and habits.

The Growth in Distance Education for High School Students

Although few jurisdictions faced geographic challenges as severe as those in Newfoundland and Labrador, distance education opportunities for high school students

were also being explored elsewhere in Canada and the United States. As was the case with the audio-graphics distance education system in Newfoundland and Labrador, many of the early examples of distance education programs across North America were primarily designed for a select group of high school students, specifically those with higher aptitudes, higher achievement, and greater aspirations for postsecondary education. For example, in their second year evaluation of the Virtual High School (VHS), Espinoza, Dove, Zucker and Kozma (1999) stated that "it was found that VHS was serving a fairly narrow range of students, those who were academically advanced and college bound" (p. 48). The courses developed by the VHS illustrate this trend. For example, courses such as Advanced Placement Statistics, Environmental Ethics, and Russian, Soviet, and Post-Soviet Studies were designed and implemented in such a way that these courses excluded all but the most talented and motivated high school students.

Research literature also substantiates this trend. Based upon a review of the literature, Roblyer and Elbaum (2000) concluded, "only students with a high need to control and structure their own learning may choose distance formats freely" (p. 61). Other scholars have also indicated that in distance programs where student selectivity was not maintained, retention rates decrease significantly (Ballas & Belyk, 2000; Barker & Wendel, 2001; Bigbie & McCarroll, 2000; Kozma et al., 2000; Roblyer, 1999; Roblyer & Elbaum, 2000). These findings have led some to question whether web-based distance education is suitable for all secondary-level students (Mulcahy, 2002). In an analysis of 19 studies investigating the effectiveness of interactive distance education technologies in K-12 education that included over 900 participants from 1980 to 1998, Cavanaugh (2001) found that there was "a small positive effect in favor of distance education" (p. 73).

Given that distance education for high school students in North America had primarily served a more selective group of students, it should not surprise anyone that these early comparative studies in K-12 distance education yielded better results than most other comparative studies in other technology-based fields.[2]

Simply put, the difference in results between distance education students and traditional classroom students in secondary education contexts may be largely explained by the selectivity of students registered in distance education programs. For example, in his analysis of 2,600 student enrollments as a mid-Western virtual high school, Mills (2003) found that the typical online student was an A or B student. In addition, in his report on the state of e-learning in Michigan, Watkins (2005) found that 45% of the students who participated in e-learning opportunities were "either advanced placement or academically advanced" students (p. 37) (also see Wigent & Oswalt, 2004). In their sponsored report on K-12 online learning in Alberta, Ballas and Belyk (2000) suggested that the low participation rate in virtual schools by students with lower testing scores indicated that the sample was "not reflective of the total population of students" (p. 28).

Based upon these examples and the current literature in general, it seems plausible that the students in these distance education studies were primarily the independent, self-motivated students who enrolled in the earliest forms of distance education opportunities in Newfoundland and Labrador and elsewhere in North America. It may also be that the students who would not have performed well in the distance education environment had already elected to drop the course before the outcome data were collected. For example, McLeod, Hughes, Brown, Choi and Maeda (2005) speculated that their own positive

[2] The "no significant differences" problem that usually occurs when innovative educational technologies are compared with traditional approaches has been well documented by Clark (1983), Reeves (2005) and Russell (1997) among others.

results in favor of virtual school students were due to the fact that many of the low-achieving students had dropped out prior to the assessment. Further, in her summary of research into distance education at the K-12 level, Rice (2006) described how many of the comparative studies were flawed because of their failure to account for variables such as early drop-outs, voluntary testing, and tests designed to favor distance education students. Unfortunately, this explanation cannot be verified because the studies included in Cavanaugh's review did not report sufficient attrition data.

Since Cavanaugh's review in 1996, there has a tremendous growth in virtual school opportunities in North America. The first two virtual schools in the United States were the VHS and the Florida Virtual School (FLVS). The VHS was created through a five year, $7.4 million federal grant (Pape, Adams, & Ribeiro, 2005), while the FLVS was established through an allocation of $200,000 from the state legislature (Friend & Johnston, 2005). The following school year (i.e., 1997-98) the VHS offered twenty-eight courses to twenty-eight schools that were a part of the initial consortium. The FLVS also began offering courses that same year with an enrollment of 157 students. Even before these first virtual schools in the USA, four schools in the Canadian province of Alberta created virtual schooling programs and offered courses to their students during the 1995-96 school year (Haughey & Muirhead, 2004). In the past decade it is estimated that the number of K-12 students who have engaged in distance education in the United States, including virtual schooling, is more than 300,000 (Setzer & Lewis, 2005). A similar increase is speculated to have occurred in Canada.

Interestingly, three years after Cavanaugh's initial review, Cavanaugh, Gillan, Kromrey, Hess and Blomeyer (2004) reported a small negative effect size in their meta-

analysis of an additional 14 studies representing over 7500 students from 1999 to 2004. Again, without specific evidence, it is primarily speculation, but it seems reasonable to conclude that this more recent sample of distance education comparative studies was conducted with a more diverse population of students stemming from the greater proliferation of web-based distance education in K-12 contexts.

The Centre for Distance Learning and Innovation

After a series of individual school districts and provincial web-based distance education projects in mathematics, science, and technology, the Government of Newfoundland and Labrador appointed a ministerial panel to, among other things, "examine the current educational delivery model and consider alternative approaches" in 1999 (Sparkes & Williams, 2000, p. 2). In their report, the ministerial panel recommended the creation of the Centre for Distance Learning and Innovation (CDLI) to be based upon the web-based model that had been evolving throughout the province. The vision of the CDLI was to provide access to educational opportunities for students, teachers, and other adult learners in both rural and urban communities in a manner that rendered distance transparent; eliminated geographical and demographic barriers as obstacles to broad, quality educational programs and services; and developed a culture of e-learning in the schools which is considered to be an integral part of school life for all teachers and students.

The CDLI came into existence in 2000 and offered its first courses during the 2001-02 school year. During that first year a limited number of enrollments were made available in an effort to field test the method of delivery and the content material that had been developed. Beginning with the 2002-03 school year, any student from across the

province was given permission to enroll in any course offered by the CDLI. No longer was secondary distance education attractive only to the elite students, particularly with the decision made by the CDLI to develop a number of non-highly-academic courses, such as Art Technologies 1201, Communications Technology 2104/3104, and World Geography 3202. Prior to this decision, previous distance education programs in Newfoundland and Labrador (and elsewhere in North America) have primarily focused upon offering courses that were only accessible by students with the right sequence of advanced-level prerequisite courses or that simply were not attractive to non-elite students. The student population of the CDLI now had the potential to include students of all ability levels.

More specific information about the CDLI is provided in subsequent chapters of this dissertation. It was chosen as the context for this study for several reasons. First, it is a unique distance education program developed in an area of the world (Newfoundland and Labrador) where the need for such an initiative is clear and widely accepted. Second, based on my experience with a variety of virtual high schools, I believed (and continue to believe) that the method of delivery utilized by the CDLI is partially responsible for the seemingly wide range of students enrolled in their courses. Third, I am a native of Newfoundland and Labrador, and I wanted to conduct my dissertation in a manner that would provide the most benefit for the people in my native province of Canada. Fourth, because of my longtime associations with education in Newfoundland and Labrador and specifically the CDLI since its inception (see Chapter Three for more details), I believed that it would be easier for me to gain access into the program for research purposes. Fifth and most importantly, the CDLI program appeared to provide an ideal context for

addressing the types of research questions I had defined for my study. These questions are clarified in the next section.

Research Purpose, Questions and Goals

The purpose of this study was to examine the nature of web-based learning in Newfoundland and Labrador secondary education. Specifically, this study examined how students interacted with their web-based courses and the process they undertook when they needed help. This general purpose lent itself to three research questions:

1. What are the students' experiences during their synchronous time online?
2. What are the students' experiences during their asynchronous time online?
3. When students require content-based assistance, where do they seek that assistance and why do they choose those sources?

The primary goals of this research were to investigate the web-based learning experience for students in Newfoundland and Labrador's CDLI and what kinds of support and assistance were most highly used and valued by students in their learning in that environment. These goals were interpretivist in nature, as I was interested in describing the system of web-based distance education in Newfoundland and Labrador from the students' perspective with the goal of understanding the sources students regarded as providing the most assistance while engaged in this web-based environment. The importance of this study stems from the fact that while several previous studies have examined the types of secondary students attracted to virtual learning, and other studies had attempted to compare the performance of students in virtual schools with that of students in traditional schools, few, if any, researchers had undertaken a comprehensive investigation of students' experiences in virtual schools of the kind I wanted to do. In

many ways, the basic interpretivist goals of my study represented the foundational descriptive work that usually precedes experimentation in any scientific field. In other words, it was important to know how students in virtual schools engage in distance education and what kinds of support they seek and value.

Another reason that this study was important was that a better understanding of what students did while they were engaged in their web-based distance education, but not under the direct supervision of a teacher (regardless of whether the teacher was in the school or at a distance), would be useful for developing more effective asynchronous teaching strategies and support systems for the students. Without an understanding of what students were actually doing and how they could be better supported when they were not engaged in synchronous instruction, the CDLI and other virtual schools in North America had an insufficient foundation for designing better support for their students.

Qualitative research methods (described in detail in Chapter Three) were appropriate tools to examine the proposed research questions. According to the National Science Foundation in the USA, qualitative research "seeks detailed knowledge of specific cases, often with the goal of finding out 'how' things happen (or happened)…. [and] to 'make the facts understandable'…" (Ragin, Nagel, & White, 2004, p. 10). More specifically, the qualitative research method that was utilized for the study is case study analysis. Case study analysis is similar to ethnographic methods, with the exception that the researcher is seeking to answer more specific questions in a shorter period of time (Hays, 2004).

Overview of Structure of this Dissertation

This first chapter has presented my research problem, goals, questions, and importance. Chapter Two presents a thorough review of the literature related to virtual schools for secondary education. Chapter Three delineates the qualitative case study methodology chosen for this study. Chapter Four describes the rural context of the research site selected for this study. Chapter Five presents the analysis and discussion of the data collected. Finally, Chapter Six explains recommendations stemming from my analysis as well as future research directions.

Definition of Terms

Audio-graphics system. The audio-graphics system of distance education in Newfoundland and Labrador utilized the TETRA as a backbone for transmission. The system itself was operated using bridging technology to provide conference calling facilities that were accompanied by the use of a telegraphic device for reproducing handwriting by converting the manually controlled movements of a pen into signals that appeared on the screens at remote sites.

Distance education. Moore (1972) differentiated distance education from traditional (i.e., classroom) education based upon teaching behavior. The first, contiguous teaching, included traditional teaching situations, such as lectures, seminars, classes, and tutorials. He described the method of contiguous teaching as the teacher being in immediate physical proximity to the students where they communicated using the human voice and this interaction was "immediate, spontaneous, often emotionally motivated" (p. 76). Alternatively, distance teaching was defined as "the family of instructional methods in

which the teaching behaviors are executed apart from the learning behaviors" (p. 76). These teaching behaviors could include those performed by the contiguous teacher, however these would be mediated through print or electronic devices.

Online learning: In his recent dissertation, Butz (2004) defined online learning as a form of distance education where the primary manner in which a student would access materials and interact with the teacher or other students was mediated through the Internet.

Rural / Urban. In Newfoundland and Labrador the official classifications of rural and urban are made based upon the definitions provided by Statistics Canada. An urban area includes:

> Census Metropolitan Areas (CMA), Census Agglomerations (CA) and other communities 5,000 and over. A CMA is defined as the main labor market area of an urban area (the urbanized core) of at least 100,000 population, based on the previous census. CMAs are comprised of one or more census subdivisions (CSDs) that meet at least one of the following criteria: 1. the CSD falls completely or partly inside the urbanized core; 2. at least 50% of the employed labor force living in the CSD works in the urbanized core; or 3. at least 25% of the employed labor force working in the CSD lives in the urbanized core… A CA is defined as the main labor market area of an urban area (the urbanized core) of at least 10,000 population, based on the previous census. CAs are comprised of one or more census subdivisions (CSDs) that meet at least one of the following criteria: 1. the CSD falls completely or partly inside the

> urbanized core; 2. at least 50% of the employed labor force living in the CSD works in the urbanized core; or 3. at least 25% of the employed labor force working in the CSD lives in the urbanized core. (Government of Newfoundland, 2002)

Virtual School. Clark (2000) defines virtual schools as "a state approved and/or regionally accredited school that offers secondary credit courses through distance learning methods that include Internet-based delivery" (p. i).

Chapter 2: Review of the Literature

The purpose of this study was to examine student experiences in web-based learning in Newfoundland and Labrador secondary education, specifically what aided students in their learning in that environment. This was accomplished by investigating how students in a specific rural all grade school interacted with their web-based courses and the process they undertook when they needed help. The design of the study and the interpretation of the results have been informed by the review of the literature reported in this chapter. This review of the literature includes research related to factors pertaining to rural schooling, distance education, educational psychology/adult education, and virtual schooling.

In this chapter I provide a critical analysis of the factors that led to the development of virtual schooling as a means for rural schools to provide an equitable curriculum compared to their urban counterparts. Further, I examine the nature of virtual schools, along with the benefits and challenges inherent to this form of distance education for this population of students. Finally, I discuss the future direction of research into rural education and virtual schooling. More specifically, my goal of this literature review is to address the following six questions:

1. How are rural schools different from urban schools?
2. What are some of the ways that rural schools have attempted to address the needs created by these differences?

3. How are virtual schools and virtual school students described in the literature?
4. What are some of the benefits of distance education/virtual schooling for rural schools?
5. What are some of the challenges of distance education/virtual schooling for rural schools?
6. What research is needed to extend the benefits and meet the challenges of distance education/virtual schooling for rural schools?

My literature review began during the Fall 2004 semester with the completion of a doctoral topical seminar called EDIT 9990: Establishing and Sustaining a Program of Inquiry, continued during my comprehensive examinations, and persisted as I progressed further into this line of inquiry – both through further exploration of the literature and through the design and implementation of various research studies. Many of the primary resources I have consulted for this review were brought to my attention by colleagues I met at the annual Virtual School Symposium as well as at the Annual Meeting of the American Educational Research Association. These colleagues have written about virtual schooling or are interested in similar research. These individuals initially provided significant guidance about where to locate research related to what amounts to a unique area of scholarship. The literature for virtual schooling is relatively new and its dissemination has primarily occurred through private research centers or doctoral dissertations.

To extend my review beyond the material referred to me by like-minded colleagues, I have consulted several databases available through the University of Georgia Library System, including the Galileo and GIL databases. Due to the large

number of private research center reports and/or evaluations I have also consulted the World-Wide Web using the Google® search engine, including Google® Scholar, on a regular basis. Using these resources, I have conducted searches using a variety of search terms including, but not limited to: virtual school, cyberschool, K-12 online learning and distance education, rural schooling, and andragogy and pedagogy.

When possible, I have attempted to focus my review on refereed journal publications and papers from refereed conferences. However, the amount of published research evidence in this body of literature was limited. Much of the published literature is based upon the personal experiences of those involved in the actual practice of virtual schooling, while much of the research is only available in unpublished Masters' theses and Doctoral dissertations. These non-refereed documents were included when there were not refereed documents available or when the methodology of these studies was judged to be sufficiently rigorous.

Differences between Rural and Urban Schooling

In addition to the obvious contrast in student population, rural schools differ from schools located in urban and suburban areas in important ways. In their review of key literature over the past 25 years, Kannapel and DeYoung (1999) found that rural schools contained a strong sense of community and were regularly the focus of the cultural and social aspects of the community. They also found that "extracurricular and non-academic activities are often valued as much or more than academics, and a higher proportion of students participate in extracurricular activities than in urban schools" (p. 170). It should be noted that three of the eleven "key" pieces of literature were written by DeYoung, one of the two authors of this review.

There are indirect differences between rural schools and urban schools as well the direct differences mentioned above. In a report prepared for the Northwest Regional Educational Laboratory, Miller (1991) stated that teachers from the local schools are more often leaders in their rural communities. He also indicated that, unlike in urban areas, the presence of a school in a rural community often carries unrecognized economic benefits from having an additional set of professionals (and their purchasing power) within the community. If a school is closed in an urban area, the economic impact may be offset by the diversity in that urban economy. However, the loss of a school in a rural area means the loss of a part of the economic and social fabric of the community that is not easily replaced. The report by Miller is typical of much of the literature in the field, in that it is a report sponsored by a research organization or branch of the government in an attempt to describe trends, issues, or problems in rural education.

There is also evidence that rural schools affect students differently, both in the perception of their schooling experience and aspirations for their education beyond secondary school. Empirical evidence indicates that rural schools often do not adequately prepare students to be successful at colleges and universities. Baker, Linhart and Dunham (1999) surveyed almost 700 high school graduates from three classes over a five year period. They found that while 80% of rural high school graduates enrolled in a post-secondary institution upon graduation, about 50% of those changed their major or dropped out before completion of their degree program. The authors concluded that graduates from rural high schools “perceive that their secondary education programs are preparing them to meet post-secondary enrollment criteria and not the total post-secondary educational experience” (p. 18). Essentially, the rural schools offered an

appropriate selection of courses to make them eligible for admission to a post-secondary school, but were unable to offer the more rigorous courses that would have prepared them to succeed there. In their survey of more than 1200 high school seniors in Ohio, McCracken and Barcinas (1991) found that of those students who planned to attend post-secondary institutions, the goals of rural school students were different than the goals of urban school students. Rural students were more likely to pursue studies in agriculture, education, and the health sciences, while urban students were more likely to pursue studies in the arts, sciences, social sciences, and business.

Survey studies, such as these, are the most common form of research published in the major rural education academic journals, such as the *Rural Educator* and the *Journal of Research in Rural Education*. Survey methodologies in rural education research are problematic for various reasons. The vast majority of studies I reviewed made no mention of pilot testing of the survey on "small groups to determine their usefulness and perhaps, reliability" (Marshall & Rossman, 1999, p. 130). The authors also reminded researchers that estimating reliability is another method to increase the accuracy of measurement in survey research, another aspect that is largely absent in the rural education literature I reviewed. In his review of survey research, Bartlett (2005) outlined the difficulties associated with falling response rates associated with survey research and cited literature from as early as the 1980s. Finally, in their research guide, Marshall and Rossman (1999) posited that the main weakness of survey research is that "they are of little value for examining complex social relationships or intricate patterns of interaction" (p. 131), both of which accurately describe many of the problems rural education researchers, and educational researchers in general, wish to address.

These differences in the nature of rural schools and rural students were also reflected through a difference in the needs of rural schools. Due to a small population and typically less valuable tax base, rural schools have difficulty in attracting and retaining highly qualified teachers, particularly in high demand and specialized areas. In their commissioned study about understanding and overcoming issues specific to rural education, *Rural Education: Issues and Strategies*, the Government of New York (1992) described the challenge in the recruitment and retention of teachers and administrators to rural areas, citing the turnover rate in rural areas at between 30%-50%, compared to a national rate of only six percent. The authors claimed that new administrators often gain much needed experience in rural schools before moving on to schools in other settings. This finding was consistent with Kannapel and DeYoung (1999), who found that teachers in rural schools were younger and less experienced than teachers in urban schools. In describing the use of virtual schools and virtual schooling in the province of Newfoundland and Labrador, Furey and Murphy (2005) discussed the challenge attracting and retaining subject expertise teachers in many rural areas. Like administrators, teachers often used rural schools as a way to gain initial classroom experience before moving to schools in larger geographic areas.

In addition to lower levels of compensation, there are a variety of other reasons why rural schools have difficulty in attracting and retaining teachers. In a survey study conducted with 558 rural school teachers in the Canadian province of British Columbia, Storey (1993) found that the lack of social and recreational opportunities, along with lower compensation, were factors in teachers' decisions to decline or leave positions in rural areas. This was supported by Collins (1999) who, in his brief to the Department of

Education on the issue of attracting and retaining teachers in rural areas, cited social, cultural and professional isolation as one of the main reasons why teachers leave rural areas.

Another of the difficulties he identified in attracting teachers to rural areas is the requirement that teachers must teach multiple grade levels and multiple subject areas. This was consistent with the findings of Kannapel and DeYoung (1999), who stated that rural teachers often teach more subjects than urban teachers. The issue of teaching load is a perennial issue, as many rural schools will offer courses in two or three year cycles to enable a wider selection of courses. This means that teachers have a different set of courses to teach each year. A rural science teacher may teach biology one year, physics the next, then chemistry in the third year before coming back to biology again. Kannapel and DeYoung (1999) noted that this raised the problems of rural school teachers often having fewer opportunities for continuous professional learning than urban teachers.

The cycle of course rotation also raises issues over whether or not rural schools are able to offer the same curriculum as larger, urban schools. In a study of almost fifteen hundred United States high schools, a third of which were considered small schools, Barker (1985) found that students in high schools with an enrollment of less than 500 faced a severe curriculum disadvantage compared to students in high schools of more than 1000 enrollments. Further, the Government of New York (1992) concluded that many schools were only able to offer the basics to meet minimum state requirements to prepare students for post-secondary admission or work force abilities. More recently, in his description of the creation of a web-based distance education high school, Benson (1998) indicated at the time Dover High School was created rural schools in Oklahoma

were historically not meeting the curriculum needs of students. Rural schools in that state offered far from adequate choices to encourage students to achieve at the highest level.

In Canada, Ryan, Sackney and Birnie (1981) conducted a study of small secondary schools in Saskatchewan on behalf of the Saskatchewan School Trustees Association. They reported that schools having less than 150 students were only able to offer two thirds of the courses offered by secondary schools that had 900 or more students. These findings were consistent with the opinions expressed by Harrison and Downey (1965), who a decade and a half earlier stated that in most instances small schools were only able to offer enough courses to satisfy an academic program and little more. More specifically, Beckner and O'Neal (1980), in their discussion of the relationship between school size and a school's effectiveness, stated:

> Curriculum offerings in smaller schools are more limited, both in scope and in depth. This is particularly true in the vocational area and in the provision of special programs for the gifted, handicapped, and remedial students. Small high schools also face problems in changing course offerings to meet the changing needs of students and the society. (p. 4)

The inability to offer a wide variety of courses is a common problem in many rural areas, as school enrollment is typically low at each grade level, which prevents the school from offering more than one or two academic tracks of course offerings. This means that most rural schools offer little more than the minimum courses that are required for graduation.

In the face of declining enrollment, the Government of Newfoundland and Labrador commissioned a task force study into the quality of educational programs in 1978. As a part of that report, Crocker and Riggs (1979) found substantial differences in

programming from school to school. They stated that "with the exception of language arts and mathematics, not all schools offer the same minimum to all students" (p. 102). They also found that while every school was offering a science program, there was little equity in which sciences and how much of each science that students were able to avail. This was similar to the social studies program, where in some schools students were not able to take history and geography. The authors concluded "that most schools still offer only a limited program" (p. 102).

In his survey study of small schools, also commissioned by the Government of Newfoundland and Labrador, Riggs (1987) found that superintendents and principals often cited inequities in the offerings of senior high courses across schools based on their status as rural or urban. He further pointed out that while schools were able to offer enough grade twelve courses to make students eligible to graduate, "in many cases it is a very restricted program, offering virtually no options and in some cases no opportunity to study courses which are prerequisites to entry into post-secondary programs" (p. 26). Like other rural jurisdictions, schools in many places in Newfoundland and Labrador are able to offer a curriculum that will satisfy provincial graduation requirements, but provide little choice or enrichment to their students. In summary, there is overwhelming evidence based upon the existing literature that small and rural schools were not offering the same caliber or quantity of curriculum as larger and urban schools.

Addressing the Unique Needs of Rural Schools

One of the main ways that the unique needs of rural schools have been addressed in the past was through consolidation of schools and school districts. As an example of this policy, it was reported by the Northwest Regional Educational Laboratory through

their “School Improvement Research Series” that from 1940 to 1990 there was a decrease in the total number of elementary and secondary public schools in the United States from approximately 200,000 to 62,037 (Cotton, 1996). The logic behind consolidation was simple, if the school was not large enough to attract qualified teachers or offer enough variety in the curriculum, it was often combined with other schools to ensure a larger tax base and student population to address these inequities. Both the move towards consolidation and the support for it as a policy has decreased in recent years for a variety of reasons, including the distance between remaining rural schools and the required length of time students would have to spend on a school bus to get from their homes to distant schools. In the past two decades, another way that rural schools have attempted to address these needs has been through creating opportunities for distance learning, and more recently through the use of virtual schooling.

At the request of the U. S. Congressional Committee on Education and Labor, the Office of Technology Assessment (1988) studied the potential of interactive technology to improve the quality of education, along with analyzing the possible barriers to achieving this potential. They concluded that distance education programs could increase the access to instruction by students whose educational opportunities were severely limited by geography. As an example of how rural schools started to use this option, fifteen years ago Barker (1991) provided a description of how over 1000 schools in more than 40 states were taking advantage of distance education programs delivered via satellite telecommunications, microcomputer-based audiographics teleteaching, or two way television systems. The Government of New York (1992) also promoted distance learning in rural schools as a way to expand the curriculum for all students, but

particularly gifted students. In a survey of rural schools regarding how small schools use distance education, Barker and Hall (1994) found that all 130 small schools (i.e., schools with less than 300 students), representing 32 states, were using distance education to provide curriculum equity to their students. In a National Association of State Boards of Education policy brief, Claycomb, Louis, Bogden and Kysilko (1996) indicated that distance education programs were being used as a way to "expand curriculum choices for low concentrations of students in remote locations" and were reaching 200,000 students in 48 states (p. 22).

The use of distance education in the K-12 environment stemming from a need to provide equal educational opportunities to rural areas was also common in Canada, as described by Haughey and Muirhead (1999) in their report on the best practices of online learning for the Government of Alberta. More recently, in describing the context for their interview study of transactional distance with web-based teachers, Murphy, Rodriquez and Ciszewska (2006) discussed the development of a distance education program in Newfoundland and Labrador evolving from the need to overcome the challenges of educating a remote and isolated population. Throughout much of the previous two decades, distance education has become a primary way to address the curriculum needs of rural education. Over the past decade, web-based virtual high schools have emerged as the primary delivery modes for distance education to rural students in North America.

Shortly after virtual schools were first introduced to rural schools, Clark (2000) presented his important overview entitled *Virtual High Schools: State of the States*. In this document he outlined three statewide virtual schools that had already been created (i.e., Florida, New Mexico, and Utah), three statewide virtual schools that were in the

planning stages (i.e., Illinois, Kentucky, and Michigan), and two highly successful non-statewide initiatives (i.e., the Virtual High School [VHS] and CLASS.com). The following year, he indicated that there were at least fourteen states with operational or planned virtual schools and extrapolated that there were between 40,000 to 50,000 students enrolled in virtual courses in the United States (Clark, 2001). That same year in the monthly magazine published by the National School Boards Association, Vail (2001) reported that there were more than fifty charter and public schools running online programs in at least 30 states. This represents significant growth during the first five years that this form of distance education has been available in the United States.

The last four years have continued to see similar growth in the United States. In a summary of the five years of evaluation of the VHS, Zucker and Kozma (2003) reported that the consortium then contained almost 200 high schools within 24 states, as well as an expansion to 10 foreign countries. Two years later, Pape et al. (2005) indicated that this consortium had increased to 232 schools in 26 states and 11 countries. In their review of state-level policy for the North Central Regional Educational Laboratory (NCREL), Watson, Winograd and Kalmon (2004) found that eleven of the twenty-two states that they surveyed had a substantial level of activity, or the presence of legislation and/or regulations concerning virtual schooling. In a more comprehensive follow-up to that study, Watson and Kalmon (2005) surveyed all fifty US states and found that approximately half of them had significant policies for virtual schooling. They also found that there were 21 states that had virtual schools operating on a statewide basis (although in some instances these were district-based or university-based programs that had

students enrolled from across the state). In their second follow-up report, the authors found that there were now 24 statewide virtual schools (Watson & Ryan, 2006).

Huerta and González (2004) estimated that over the 5 years preceding their study there had been approximately 60 cyber charter schools in 15 states serving over 16,000 students. Setzer and Lewis (2005) speculated that there were approximately 328,000 public school enrollments in online or two-way television distance education programs in the United States. However, it should be noted that this figure would include all online distance education programs, not just virtual school students.

The combination of state sanctioned virtual high schools, virtual charter schools, students served by online homeschool association endeavors (such as the online course offerings of the Pennsylvania Homeschoolers Association), university laboratory schools, and other online course offerings (such as commercial ventures like APEX Inc. and Class.com Inc.) has provided a growing opportunity for secondary school students to complete individual courses, and in many instances entire high school diplomas, through virtual school offerings. In their survey of state virtual schools, Gray and Tucker (2006) found that there were "139,000 students enrolled in at least one course through a state virtual school" (p. 1). Based upon the 50 percent growth rate over the past five years of the two oldest state programs, the Florida Virtual School (FLVS) and the Electronic High School in Utah, the authors predicted that there would be over a half a million students taking courses from state sponsored virtual school programs within a few years. Most recently, Picciano and Seaman (2007) estimated that the overall number of K-12 students engaged in online courses in 2005-2006 was approximately 700,000.

Rapidly growing programs such as these provided the basis for the National Education Association's prediction that by 2006 a majority of American high school students will have completed at least one online course before graduation (Fulton, 2002a). The potential that a majority of high school students have completed an online course may have seemed unlikely, however, there have been recent developments which will make this prediction possible. For example, in the *Michigan Merit Curriculum Guidelines: Online Experience* that Government of Michigan outlined the decision to be the first state in America to require that all students will be required to take at least one online course as a requirement for graduation (Department of Education, 2006). During the 2003-04 school year there were less than 8,000 student enrollments for the Michigan Virtual High School had (Borja, 2005), but there were over 525,000 high school students in Michigan during this same time period (National Center for Educational Statistics, 2005). So the potential for a dramatic increase in the number of students enrolled in virtual school courses, in both Michigan and the country as a whole, is high.

In the Canadian context, from 1995 to 1999 there were 23 virtual school programs operating in the province of Alberta (Muirhead, 1999). In a national survey of virtual schooling in Canada, O'Haire, Froese-Germain and Lane- De Baie (2003) reported that Alberta had the most students engaged in virtual schooling, with approximately 4,500 full-time and 2,500 part-time K-12 students in more than 20 schools. Over the past four years, the Centre for Distance Learning and Innovation in Newfoundland and Labrador has increased from 200 student enrollments in ten courses representing 76 different schools in 2001-02, to 1,500 student enrollments in thirty-five courses in 95 different schools in 2004-05 (Government of Newfoundland and Labrador, 2004). Contact North,

the virtual school serving Northern Ontario, reported 11,222 registrations in their 548 courses for the year 2000-01, an increase of 12% over the previous year (Betty, Hebert, & Sefton, 2002).

In 2001-02, a partnership of eighteen school districts in British Columbia offered a pilot electronic distance education program for 2200 students (Kuehn, 2002). With over 17,000 student enrollments in distance education, five years later the province of British Columbia launched a new province-wide virtual school, *Learnnow BC*, to provide rural and remote students "with more course choices and flexibility" (Government of British Columbia, 2006). This growth has even been experienced in urban areas where over the past four years the Vancouver School Board (the largest in British Columbia) and the Toronto District School Board (the largest in Canada) have established their own virtual schools. Even with the spread of virtual schools into urban areas in Canada and the United States, Clarke (2003) concluded that the majority of schools that participate in K-12 distance education and virtual schooling are rural and small schools.

Nature of Virtual Schooling and Virtual School Students

There is a general perception that a virtual school is an online, Internet-based or web-based distance education program available to K-12 schools and students. In fact, in their initial *Keeping Pace with K-12 Online Learning: A Snapshot of State-Level Policy and Practice*, Watson et al (2004) chose to survey how the states were legislating and implementing K-12 online learning – which they defined as education in which instruction and content are delivered primarily via the Internet. However, the definitions for virtual school found in the literature are more exclusive in their classification.

Clark (2000) defined virtual schools as "a state approved and/or regionally accredited school that offers secondary credit courses through distance learning methods that include Internet-based delivery" (p. i). In Canada, Barker, Wendel and Richmond (1999) provided a similar, but even more exclusive definition. They defined a virtual school as "one that offers the mandated provincial instructional program to students through web-based means (i.e., computer-mediated and online via the Internet)" (p. 2). Further, they described a virtual school as being "characterized by a structured learning environment under the direct supervision of a teacher, web-based delivery to home or in a setting other than that of the teacher, and contains instruction that may be synchronous or asynchronous" (p. 2). In the complete description of their definition, Barker et al. described how a virtual school was one where students took all of their courses in the virtual environment. According to the definition, popular American virtual schools (such as the VHS and the FLVS) provide virtual schooling opportunities, but are not virtual schools because their students are not all full time virtual learners. Within the literature, Clark's definition has been the more accepted of the two.

According to Clark, virtual schooling is also primarily a North American phenomenon (Cavanaugh et al., 2006). This is supported by a recent study conducted by the North American Council for Online Learning (NACOL). In a survey of Ministries of Education from 30 countries, Powell and Patrick (2006) found that while many other countries operated some form of web-based or online curricular support program for students and teachers (e.g., a SchoolNet such as the one found at http://www.schoolnet.org.uk/), and some even offered web-based or online distance education programs, only Canada and the United States operated entities that would be

classified as virtual schools. Glen Russell at Monash University in Australia is one of the few scholars outside of North America who has written about virtual schooling. His work has added to our conceptual understanding of virtual schooling from an international perspective, although he relies upon the North American experience in outlining his perceptions (e.g., Russell, 2001, 2002, 2003, 2004, 2005, 2006a, 2006b).

Clark (2001) indicated that there were different types of virtual schools and described them based on the seven categories found in Table 2.1.

Table 2.1. Clark's seven categories of virtual schools

Type	Description
State-sanctioned, state-level	Those virtual schools that operate on a state-wide level, such as the FLVS or the Illinois Virtual School (IVHS).
College and university-based	Those independent university high schools or university-sponsored delivery of courses to K-12 students, such as the University of Nebraska-Lincoln Independent Study High School or the University of California College Prep Online (UCCP).
Consortium and regionally-based	Those virtual schools operated by a group of schools or school districts that pool their resources to participate, such as the VHS.
Local education agency-based	Those virtual schools operated by a single school or school district, such as the Gwinnett County Online Campus or the Cobb County eSchool.
Virtual charter schools	Those virtual schools created under the charter school legislation that has been passed in many states, such as Connections Academy, also commonly known as cyberschools.
Private virtual schools	Those virtual schools that are operated in the same manner as a brick and mortar private school, such as the Christa McAuliffe Academy in Washington state.
For-profit providers of curricula, content, tool and infrastructure	Those commercial companies that act as vendors for the delivery of courses or the use of course materials, such as APEX Learning or Aventa Learning.

Watson, Winograd and Kalmon (2004) offered a different classification with five different types of virtual school which were summarized by Rice (2006) in Table 2.2.

Table 2.2. Watson, Winograd and Kalmon's five categories of virtual schools (p. 427)

Type	Description
Statewide supplemental programs	Students take individual courses but are enrolled in a physical school or cyber school within the state. These programs are authorized by the state and overseen by state education governing agencies.
District-level supplemental programs	Are typically operated by autonomous districts and are typically not tracked by state agencies.
Single-district cyber schools	Provide an alternative to the traditional face-to-face school environment and are offered by individual districts for students within that district.
Multi-district cyber schools	Are operated within individual school districts but enroll students from other school districts within the state. This represents the largest growth sector in K-12 online learning.
Cyber charters	Axe chartered within a single district but can draw students from across the state. In many cases they are connected in some way to commercial curriculum providers.

Regardless of which classification is considered, it should be understood that there is a great deal of variety in the different types of virtual schools that are currently operating in North America.

The variety in virtual schooling is not limited to the different classifications of virtual schools, but also extends to actual the delivery of virtual schooling. As Kaseman and Kaseman (2000) accurately pointed out in the *Home Education Magazine*, some virtual school courses operate much like traditional correspondence courses with student interaction being limited to readings and written responses, while in others students interact with their teacher and classmates through e-mail, discussion forums, chat rooms, instant messaging, real-time audio conversations, and even video conferencing. This student interaction can be unscheduled, where students can work at their own pace when it is convenient for them, or it can be scheduled to allow for the real-time interactions. Within all of this variety, there are three dominant methods of delivery that have emerged

for virtual schooling: independent, asynchronous, and synchronous (or a combination of asynchronous and synchronous).

The student who is taking a course from a virtual school with an independent method of delivery is similar to the student who would take a traditional correspondence course, only with the computer mediating the experience. Greenway and Vanourek (2006) described the experience of one sixth grade virtual student in this independent environment as:

> In a "typical" day, a student might take mostly core courses with some electives and log on to the computer for an hour or two, clicking through interactive lessons with text, audio or video clips, Flash animation, and links to related sites; completing an online math quiz; e-mailing the teacher; and "chatting" with classmates online. Students complete the majority of their work offline in many of these online schools, for example, reading assignments, drafting an essay, conducting an experiment with school-supplied materials, and studying for an exam. . . . A parent or other responsible adult is asked to supervise—and sometimes to assist with instruction and motivation, all under the direction of a licensed teacher.

As illustrated by this description, the student is essentially teaching themselves or being taught by a parent, with only minimum involvement from a teacher and the virtual school simply providing the materials used by the student. This method of delivery appears to be most closely associated in the literature with schools using the services of K12, Inc. or the Visions Academy (Bracey, 2004; Ohanian, 2004; Scherer, 2006).

The asynchronous method of delivery is more common among the statewide virtual schools throughout the United States. For example, in describing how a student would take a course through the FLVS, Friend and Johnston (2005) described how the students would interact with online curriculum, based upon Florida's Sunshine State Standards. This curriculum engaged them in real-world applications, taking them through each of the steps of Gagne's nine events of instruction, challenging them with content that is primarily designed for the higher levels of Bloom's taxonomy, and providing them with choice in the resources that they use and how they demonstrate a mastery of the content. After the student has finished interacting with the curriculum, the students turns "in assignments, and the teacher gives written feedback in the electronic course room or phones to discuss ways the [student] can improve performance" (p. 109).

This was consistent with the description provided by Zucker and Kozma (2003), who described a student experience in a Bioethics course offered through the VHS. A student would enter their online course where the student is presented with a photo of the teacher, possibly photos of other students, the course syllabus, and a course calendar. The student would use the syllabus, calendar, other web-based material, and interaction with their teacher to determine the specific reading assignments and written work to be completed each week. Using the course content and their textbook, if there is one for the course, the student would work through the material and complete the written work – which would be submitted to the teacher for written feedback delivered to the student through the course management system.

In the example of the Bioethics course, students would "bring an article to class about a current event dealing with bioethics. Students post a synopsis of each article and

participate in a discussion about the articles" (p. 59). Based upon the instructions for this activity, the students were the driving force behind the participation and the teacher simply monitored the discussion, only contributing when "she [saw] serious misunderstandings, errors, or problems" (p. 60). Unlike the description of the independent method of delivery, the virtual school provides much more than a set of resources by using a robust course management system that allows for the interaction between the teacher and the students, and amongst students themselves. The role of the teacher in this method of delivery is much more active, guiding the students through the curriculum and not simply being the source of summative evaluation of the student's work. However, even with this increase in the level of teacher involvement, there is still a great deal of independence (and even isolation) associated with the asynchronous method of delivery.

Unlike their American counterparts who have to deal with the reality of local authority over education, it is more common for district-wide, consortium or provincial virtual schools in Canada to offer synchronous classes during the school day in a delivery method that utilizes a combination of both asynchronous and synchronous instruction.[3] A good example of a synchronous learning environment is provided by Murphy and Coffin (2003), "when students first enter the virtual classroom, they have access to DM [direct messaging] and hand raising. Access to other tools, such as the microphone or the WB [whiteboard], must be assigned by the teacher" (p. 236). Using these tools, the teacher can lead a traditional lecture, using slides on the whiteboard to guide their thoughts or as notes for the student. In his dissertation examining social presence with web-based

[3] It should be noted there are many virtual schools in Canada that also operate using one of the other two methods of delivery – only that the use of the synchronous method tends to be more common in Canada than the United States.

instructors who taught in a combination synchronous and asynchronous environment, Nippard (2005) described many of the different kinds of interaction that would be expected from a traditional classroom, with the teacher presenting the content in a lecture-style with notes or worked examples on the whiteboard and students asking their teachers questions using both the audio and text-based communication tools based on their presentation of the content.

Teachers can also facilitate an audio or text-based discussion with the students. For example, in their interview and observation study of how the synchronous instruction was used in a second language French course, Murphy and Coffin (2003) described how teachers would begin the class by asking students “Quel temps fait-il chez toi?” or “What's the weather like where you are?” and some students would respond one after another using the audio feature, while others would type their answer in the direct messaging. Depending on the virtual classroom software that is utilized, there may only be the opportunity for one person to speak at a time or multiple people, however, the direct or instant messaging always allows for multiple individuals to participate in private or public discussions. The teacher also has the ability to assign students to a particular room which allows them to work in groups without the interference of audio or additional text-based discussion from members of other groups. Finally, the teacher can also assign the moderator controls over to a student to allow them to present material within the classroom.

Regardless of the method of delivery offered by the virtual school, the descriptions of the students typically found in virtual schools have been fairly consistent in the literature. However, the specific types of students may be surprising, at least based

upon the image portrayed in the popular media. For example, the covers of Time and Newsweek for the last week of March and first week of April 2006 in both Canada and the United States read "Are Kids Too Wired for Their Own Good?" and "Putting the 'We' in Web" respectively. The notion that today's students, particularly those who enroll in virtual school courses, are somehow different than previous generations and these differences are caused by access to digital technology, such as the Internet and cell phones, has become a common theme in both the popular media and has even been introduced in the academic literature (although there has been little actual research reported or conducted into these perceived differences). Probably the most often cited piece of literature, Howe and Strauss (2000) gave this next generation the label of millennials – which included all of those who were born in or after 1982. The unique characteristics that Howe and Strauss ascribed to this group included:

> They are more numerous, more affluent, better educated, and more ethnically diverse. . . . They are beginning to manifest a wide array of positive social habits that older Americans no longer associate with youth, including a focus on teamwork, achievement, modesty, and good conduct. (p. 3)

What was interesting was that Howe and Strauss made no mention of technology or the changes that have occurred in its pervasiveness during this generation of millennials. For Howe and Strauss the millennials were simply the generation that came after Generation X, in fact the entire first chapter of their book *Millennials Rising: The Next Great Generation* is devoted to describing why this generation should be called millennials, as opposed to Generation Y, Generation Next or any of the other proposed labels.

While various labels have been introduced over the past decade, most have not caught on outside of their immediate fields like the label of digital native. Based upon his own study and observations, Prensky (2001) labeled this next generation “digital natives,” as he felt that they “are all ‘native speakers’ of the digital language of computers, video games, and the Internet” (¶ 5), with those of us who are not native to this digital language being considered “digital immigrants.” Today's teenager has grown up with digital technology (e.g., cell phones, video games, computers, DVD players, video cameras, MP3 players, etc.) around them since birth, and according to Prensky (2006) the average youth, by the time they have graduated from college, has "spent fewer than 5,000 hours of their lives reading, but often more than 10,000 hours playing video games, another 10,000 on their cell phones, and more than 20,000 watching television” (pp. 27-28). While he didn’t provide a specific date, like Howe and Strauss, Prensky alluded to the fact that this generation of digital natives began at a specific time – in the same way that an immigrant is one who comes to an existing place, these natives were born during the digital age. However, in their own comprehensive review of the literature, Reeves and Oh (in press) found most of the research conducted into generational differences to be based upon “limited data, almost always conducted by survey methods characterized by a lack of reliability and validity data” (as cited in Spector et al., 2006).

As an alternative to the classification schemes proffered by Howe and Strauss (2000) and Prenskey (2001), Dede (2005a; 2005b) introduced his label of neomillennials. Initially based upon his interest in how his own daughter interacted with technology when she would come home after school, Dede based this generational label upon a set of

learning characteristics he believed made these students different. These characteristics included:

- fluency in multiple media and in simulation-based virtual settings,
- communal learning involving diverse, tacit, situated experience, with knowledge distributed across a community and a context as well as within an individual,
- a balance among experiential learning, guided mentoring, and collective reflection,
- expression through nonlinear, associational webs of representations, and
- co-design of learning experiences personalized to individual needs and preferences. (Dede, 2005B, ¶ 2)

The main difference with this classification was that it was based upon a set of learning characteristics and not on an artificial date. Neomillenials could include the generation of students described Howe and Strauss, and by Prensky, that are in educational institutions today, but could also include baby boomers, Generation X'ers, or others.

While Dede's classification of neomillennials was a set of characteristics that people of any age can possess, one of the main limitations of the other authors was the use of a specific date or time period to define their label. For example, based upon Prensky's discussion, two of the defining characteristics of digital natives were how they use Internet technology and the ubiquitous nature of their cell phones to their daily lives. Unfortunately, poor access to both of these technologies limit youth in rural areas from even having the ability to utilize the Internet or cell phones, let alone have their generation defined by how they use them. Ignoring the socio-economic realities of many

rural jurisdictions, consider the Canadian province of Newfoundland and Labrador as an example. Assuming that these rural youth have access to a computer at home, most rural portions of this province are still limited to dial-up Internet access (usually at a speed of 33.6Kb/s to 56.4Kb/s with a limited modem pool). This would mean that it would take between five and six minutes to download a 1MB digital image – which is a standard size file for picture taken with most digital cameras. It would take over a half hour to download a single song from iTunes. The boundaries of cellular coverage in Newfoundland and Labrador do not include many rural communities. For those that do have cellular service, unlike the standard plans that are available in many urban areas of Canada and United States, most standard plans offered by Bell Aliant Regional Communications are limited to 200-300 minutes and are restricted to local calling areas (i.e., long distance charges apply when calling elsewhere in the province). In addition, the standard text message rate is $0.15 for each text message that is sent and it costs $0.50 to send a picture taken with a cell phone and even $0.25 to download a picture taken with a cell phone to a computer (additional pricing information can be found at http://english.aliant.net/). Due to this lack of access to both Internet and cell phone technology, rural youth in Newfoundland and Labrador (like rural youth in most other areas) can hardly be automatically defined as millennials, digital natives or neomillennials. Given that many virtual school opportunities target rural school students, it can also be said that many virtual school students can hardly be defined as millennials, digital natives or neomillennials.

If virtual school students do not fit the stereotype of today's youth portrayed in the media, who are virtual school students? Probably the most detailed description of a

virtual school student was provided by Stevens (1999b), who described an actual student from an online Advanced Placement (AP) project who he felt possessed the characteristics and a particular routine that made him an effective online learner.

> He goes home from school and works from 4 p.m. until supper at 5 p.m. then from 6-9 p.m., Monday to Thursday and also for much of Sunday. He has his own room at home with plenty of study space and his own desk. He also has his own room at school in which to work as he is the only AP student there.
>
> His Principal and many of the teachers at his school follow his progress and report on this to the rest of the students. Accordingly, many of his fellow students take an interest in his on-line learning and have learnt about the requirements of AP subjects. From time to time the Principal will report to other teachers a good grade that this AP student has achieved. There is a qualified teacher in this student's AP subject in his school although he has never taught at this advanced level.
>
> He maintains that it is necessary to work steadily and keep to working regardless of any problems that come his way. He clearly relates very well to his AP teachers and E-mails him regularly. If there is a problem he contacts his AP teacher. From time to time he E-mails a student at Arnold's Cove who is taking the same on-line course.
>
> This student maintains that his AP course does not interfere with his social life as long as he gets works done by the time he sets himself – 9pm. His main concern appears to be the amount of work needed for the prom later in the year – particularly the decoration of the gymnasium.

> At home his mother – an ex teacher with a degree – "keep me going on this" (AP course). His mother "understands science and what I am supposed to do." She is pleased with his marks and follows his progress closely. His mother "rates me with my older brothers and sister aged 25 and 23. They got 70 and 75% respectively in this course in their first year at MUN [Memorial University of Newfoundland]." One brother is now doing honors in geology at MUN and a sister has completed a business degree. Another sister is doing a Masters degree in biochemistry at present and contemplating a PhD.
>
> He summed himself up as someone who has preferred to work by himself all through his school life. However, he pointed out that he has never been afraid to ask a teacher questions when he did not understand something. (p. 6)

While this quoted passage is rather lengthy, it is significant since it represents the type of student for whom virtual schools seems to be intended, at least in their present status of design and implementation. The description of a student who has a teacher as a parent, two siblings completing graduate-level education, access to a desk and sufficient work space in the quiet and comfortable environment of his room probably represents a small percentage of high school students in general, and an even smaller group of rural school students. Simply, it is not the description of a typical student. In fact, if the student described by Stevens is the ideal student for this environment, it presents a rather selective view of the potential audience for online learning opportunities at the K-12 level. Unfortunately, this reality described by Stevens has been one of the main limitations of virtual schooling, as is discussed later in the "Challenges of Virtual Schooling" section.

Benefits of Virtual Schooling

One of the reasons for the growth of virtual schooling is that there are a number of perceived benefits to both schools and individual students. Like much of the literature regarding virtual schooling, the benefits of virtual schooling have been largely reported based upon the perceptions of those involved in the delivery of virtual schooling and not based upon empirical research. For example, in their national survey of virtual schooling in the United States, Kellogg and Politoski (2002) stated that there are many benefits of online education for elementary and secondary schools. These benefits included the ability to provide individual instruction to meet specific needs and learning styles of students, flexibility in both scheduling and in geography, opportunity for students who are not physically able to attend a brick-and-mortar school, and higher levels of motivation. In their recent edited book on virtual schooling largely based upon practitioner contributors, Berge and Clark (2005) identified four similar benefits of virtual schooling: expanding educational access, providing high quality learning opportunities, improving student outcomes and skills, and allowing for educational choice.

Probably the most often cited benefit of virtual schooling is the first listed by Berge and Clark, expanding educational access. In her meta-analysis of 19 experimental and quasi-experimental studies, Cavanaugh (2001) described the major benefit of distance education for K-12 schools as allowing rural and small schools to offer courses that they would otherwise be unable to teach (e.g., higher level mathematics and science courses). In his recent quantitative study of student interaction and collaboration in the VHS, Zucker (2005) stated that the most common reasons given by school districts when

asked why they utilize distance education were the ability to offer courses that would not normally be offered at their school, followed by the ability to meet the needs of certain groups of students and the ability to offer AP and other college-level courses. As a part of their planning process for the UCCP Initiative, Freedman, Darrow, Watson and Lorenzo (2002) conducted a national survey of those engaged in virtual schooling across the United States. Based upon this survey, they outlined a number of potential audiences who would benefit from virtual schooling in the state of California. The primary group was students who needed or desired courses for graduation or university admission that were unavailable to them in their schools (e.g., AP or other specialized courses not offered in small, rural schools). This planning document became a reality three years later. Hernandez (2005), in describing the experiences of the UCCP Initiative, indicated that it was a way to provide equity and access to students from small and rural schools, and to students who are typically disadvantaged due to their ethnicity.

Freedman et al. (2002) also included other groups for whom the UCCP Initiative would expand access. These groups included students in alternative education programs, remedial students who had failed a course or needed additional time to complete a course, adult learners who had not completed high school, and home-schooled students. This is similar to the views expressed in a policy document for the Center on Education Policy, where Fulton (2002b) stated that online learning was beneficial to students who were not otherwise able to attend their brick-and-mortar schools, such as students who were hospitalized or homebound, students who had been removed from the schools because of suspension, assignment to alternative programs, or incarceration, and students who

traveled due to their participation in athletic events or parental status (i.e., children of politicians or diplomats who split time between a number of locations).

Virtual schooling is not the first example of using distance education to provide access to advanced learning opportunities. The student described earlier by Stevens was enrolled in a small web-based distance education program designed to offer four AP mathematics and science courses to students from ten rural schools located in a single school district (Power, Stevens, Boone, & Barry, 1999; Stevens, 1997, 1999a). Another example of programs that provide access to advanced learning opportunities are projects that allow students to earn college credits online while still in high school. Two examples of these projects are Project Advance from Syracuse University (e.g., Andrews, 2004; Brune, 1975; Mercurio, 1982 – see http://supa.syr.edu/) and the Clipper Project from Lehigh University (e.g., Bishop, Hyclak, & Yerk-Zwickl, 2007; Bishop & White, in press; Reeves, 2002 – see http://clipper.lehigh.edu/). Another notable initiative available to students in some high schools is the network certification program which includes online courses provided through the Cisco Networking Academy Curriculum (see http://www.cisco.com/warp/public/779/edu/academy_roadmap/index.htm).

The second benefit mentioned by Berge and Clark (2005) was that of providing high-quality learning opportunities. However, despite the policy documents of the Southern Regional Education Board (see Thomas, 1999, 2000, 2003) and the National Education Association (see Fulton, 2002a) which have provided standards for quality in virtual school courses, the design and delivery of all virtual school courses cannot be assumed to be of high quality. In the same way that there are good and poor classroom teachers, there are likely good and poor virtual school learning experiences as well. In

addition, in his interview study with students, teachers, and course developers, Barbour (2005a) outlined the lack of research focused on the principles of web-based design for secondary school students.

Interestingly, while the quality of virtual school course design and delivery most likely varies, the nature of virtual schooling provides a viable framework for high-quality learning opportunities that brick-and-mortar schools may not be able to match. The FLVS is a good example of an institution that has taken advantage of this framework. The FLVS uses a team of individuals to create each of its web-based courses. The team consists of instructors who act as subject matter experts, web development specialists, project managers, and external instructional designers (Johnston, 2004). The team approach allows each group of individuals to focus upon their area of expertise, for example, instructors can focus upon what students need to be able to learn or do, instructional designers can focus upon engaging activities to accomplish the goals of the instructors, web development specialists can focus upon creating a variety of learning objects that cater to a variety of learning styles to support the activities of the instructional designers, and so on. Each course designed in this manner is based on Gagné's nine events of instruction, and focuses on levels 4, 5 and 6 (i.e., analysis, synthesis, and evaluation) of Bloom's taxonomy (Friend & Johnston, 2005). While this model is not indicative of how most virtual school learning opportunities are designed, it is an example of how the nature of virtual schooling can be used to create a framework for providing high-quality learning opportunities. By contrast, most traditional classroom-based high school courses are not designed by a team of specialists, but simply developed by individual teachers or a small group of teachers within a department.

However, it is important to note that the FLVS is rather unique among virtual schools in this approach to course design.

Along with the creation or design of virtual school courses, there are also factors inherent in the delivery of virtual school learning opportunities that can allow for high quality instruction. In their research focused on the VHS, Elbaum and Tinker (1997) stated that online courses can increase the range of course offerings for students and provide them an opportunity to learn with, and from, students from different geographic and cultural perspectives than the ones found at their own brick-and-mortar schools. Tinker and Haavind (1997) stated that online courses provided students increased opportunities to interact with the teacher, and with other students, and to collaborate with their peers. They also indicated that the nature of the asynchronous functions within an online course, such as e-mail and the threaded discussion forum, allow students the necessary "think time" and provide shy students the opportunity to become involved in the conversation. However, both of these articles were not based upon research studies, but were derived from the authors own experiences with the VHS after only two years of operation. More recently, Kaplan-Leiserson (2003) described the results of another researcher's action research project where instant messaging was used as a tool for students to interact with their instructor and other students, citing benefits such as the ability to socialize and communicate their feelings about the course with others, discuss and get feedback on coursework, get to know the instructor better, and be more engaged. In his dissertation study, Butz (2004) also concluded, based upon 195 student surveys, that online instruction can motivate students who have different learning styles. Many of these findings mirror similar perceptions, as most were not based upon research studies,

found in the online learning with adult learners literature (see Cavalier, 1992; Chickering & Ehrmann, 1996; Collins, 1998; Grahame & Scarborough, 1999; Kearsley, 2000; Moller, 1998; Schoenfeld, 1993; Winn, 1990 – as some of the many examples). The unfortunate aspect is that the experiences of those involved with the FLVS, and the limited research described above are in all likelihood the exception rather than the norm across the spectrum of virtual schooling.

It should also be noted that not everyone agrees that online learning provides high quality learning experiences at any level. For example, Reeves (2003) concluded that the evidence that faculty "adoption of new technologies [such as online learning] would foster innovative pedagogy is slim" (p. 8). Reeves pointed to other critics who have questioned the investment in online education in higher education such as Cuban (2001), Noble (2001), and Postman (2003). More recently, Herrington, Reeves and Oliver (2005) concluded that the commercial course management systems used to develop most online courses in higher education today limit most faculty members to the delivery of information rather than the provision of engaging, authentic learning experiences. As stated above, although virtual schools may allow for better instruction, it certainly does not guarantee it.

A third benefit cited by Berge and Clark (2005) was improving student outcomes and skills. The authors described this benefit in terms of the current regime of *No Child Left Behind* (NCLB) in the United States, and the necessity for schools to meet Annual Yearly Progress (AYP) under that piece of legislation. As discussed earlier, the use of virtual schooling means that more students, including minority students (who are an important subset measured by NCLB), can have access to specialized courses such as AP

courses. Increasing the number of students taking and passing AP courses and AP exams, particularly if these students are from minority groups measured by NCLB, can help schools in meeting their AYP. Virtual schooling can also improve student skills in various technology proficiencies that will be useful to them as they progress to the next stages of their life. For example, in their survey of American universities, Lewis and Greene (1997) reported that as more post-secondary institutions are providing online learning opportunities it is beneficial for students to begin to acquire these skills in the safer environment provided by the K-12 experience (as cited in Butz, 2004). Zucker and Kozma (2003) surmised that online education is useful for global competitiveness, as it provides students with the skills that they will need for the new knowledge economy. However, to date there have been very few, if any, research studies to verify these potential claims.

The final benefit listed by Berge and Clark (2005) was allowing for educational choice. Berge and Clark were concerned with choice in terms of public, private, charter, and home-schooling choices, along with the necessity that schools who are not meeting their AYP under NCLB provide choice to their students. The NCLB legislation states that "a virtual school can be among schools to which eligible students are offered the opportunity to transfer as long as that school is a public elementary or secondary schools as defined by state law" (U.S. Department of Education, 2004, p. 13). As Hassell and Terrell (2004) described in their contribution to the *Virtual Schools Report*, a publication of the charter school Connections Academy, for many school districts that lack the necessary resources to offer their students choice under the NCLB requirements (e.g., a

rural school which is so very remote and geographically distant from another brick and mortar school) virtual schools may be the only option available to them.

This final benefit was also consistent with Baker, Bouras, Hartwig and McNair (2005), who described the relationship between the commercial vendor K12, Inc. and the Colorado Virtual Academy (COVA), a virtual charter school. In this chapter about their personal experiences with virtual schooling, Baker et al. discussed how using the curriculum provided by K12, Inc. enables COVA to offer choice to any parent of a student in the state of Colorado. As a charter school, public school students who choose to attend (i.e., take courses through) COVA bring with them the funding allocated for public school students to the charter school. Virtual charter schools allow public schools that do not meet their AYP under NCLB an avenue to provide educational choice to their students. Of course, there is no guarantee that the mere fact that a school is virtual means that it can provide high quality education. In fact, two studies released by the Education Policy Research Unit of the Education Policy Studies Laboratory at Arizona State University found that the level of public scrutiny (Bracey, 2004) and the quality of the curriculum (Ohanian, 2004) of K12, Inc. were both questionable. So, this conjecture must be carefully evaluated for each virtual enterprise whether it is commercial or otherwise.

Another layer of choice in virtual schooling is for home-schooled students. As students progress to the higher grades and more specialized subject areas, many parents are unable to provide curriculum support to their children due to a lack of their own knowledge base. Butz (2004) maintained that virtual charter schools can provide access to course materials and curriculum for parents of home-schooled students (n.b., this is the model that is utilized by K12, Inc. for homeschooling populations – as described by

Bracey, 2004; Ohanian, 2004). In addition to choice for charter and homeschool opportunities, virtual schooling can provide educational choice to other groups of students. In his policy document, Fulton (2002b) proposed that students who have not been successful in the traditional school environment, due to behavioral problems and other issues, often find success in online education. He also indicated that students who wished to supplement their schooling by taking extra classes in addition to their regular schedule could choose online learning opportunities as an avenue. Fulton (2002b) also observed that students for whom part-time enrollment is necessary, such as those enrolled in summer school or credit recovery programs, were often able to take advantage of online learning opportunities. These opportunities may even provide students with the opportunity to find employment while continuing their studies, due to the flexibility in scheduling that many online programs offered.

Along with the four benefits outlined by Berge and Collins, others have put forward administrative benefits for virtual schooling, particularly administrative efficiency. Russo (2001), a free-lance writer, concluded that online learning can assist schools in addressing their inability to offer certain courses and attract highly qualified teachers – a crucial issue for rural schools, the lack of physical space for students in larger schools, higher drop-out rates, and a growing movement towards home and charter schooling.

In her dissertation literature review, Keeler (2003) described the benefit to schools as decreasing the amount of time spent on discipline issues, flexibility in scheduling (both of students and teachers), and time saved on administrative tasks associated with registration, attendance, and grading. This final point is consistent with Vail (2001), an

associated editor with the *Electronic School*, who argued that online courses made it easier for teachers and administrators to monitor content delivery, for parents and learners to access current grade information, and for teachers to communicate with parents. A summary of these benefits is presented in Table 2.3.

Table 2.3. Summary of the benefits of virtual schooling

Benefit	Reference
Higher levels of motivation	Kellogg and Politoski (2002)
Expanding educational access	Berge & Clark (2005); Cavanaugh (2001); Freedman et al., (2002); Fulton (2002b); Hernandez (2005); Kellogg & Politoski (2002); Zucker (2005)
Providing high-quality learning opportunities	Berge & Clark (2005); Butz (2004); Elbaum & Tinker (1997); Fulton (2002a); Kaplan-Leiserson (2003); Kellogg & Politoski (2002); Thomas (1999; 2000; 2003); Tinker & Haavind (1997)
Improving student outcomes and skills	Berge & Clark (2005); Zucker & Kozma (2003)
Allowing for educational choice	Baker et al., (2005); Berge & Clark (2005); Butz (2004); Fulton (2002b); Hassell & Terrell (2004)
Administrative efficiency	Keeler (2003); Russo (2001); Vail (2001)

Challenges of Virtual Schooling

In addition to listing the benefits of virtual schooling, Berge and Clark (2005) also listed five challenges that virtual schools currently face. Unlike the benefits of virtual schooling, the challenges listed by Berge and Collins were based upon evidence more from research studies than the personal experiences of practitioners. The first three of these challenges were described as administrative in nature: the high start-up costs associated with virtual schools, access issues surrounding the digital divide, and the approval or accreditation of virtual schools. As Morris (2002) noted in the description of his own experiences with the Wichita eSchool, the start-up costs for many virtual schools

can be quite high. The virtual school needs to develop or purchase course content, it needs to develop or lease a means to deliver that content, and it also needs to staff a system that would handle both the administration and course delivery.

Along with the high cost associated with beginning a virtual school, students' differential capacities to access these learning opportunities also present a challenge for virtual schooling. While students are able to access the Internet at 99% of public schools in the United States (Kleiner & Lewis, 2003), the percentage of students who have access to the Internet at home is much lower. According to DeBell and Chapman (2003) approximately 70% of White and Asian children had computers in the home, however, this level decreases to approximately 33% for Black and Hispanic children. Less than a third of children from homes with an annual income of less than $20,000 had a computer. Approximately 25% of children with parents who did not complete high school had computers in the home.

Finally, Clark and Berge (2005) discussed how state approval or regional accreditation was important with respect to the ways that the public will view virtual schools. This challenge was especially important with respect to whether or not the courses offered by virtual schools would be accepted by various post-secondary institutions. This leads into a second area of challenges that Berge and Clark (2005) raised for virtual schools: public perception. While still a growing phenomenon, there has not been a wholesale acceptance of virtual schooling as an alternative to classroom instruction. In the annual Phi Delta Kappa poll on the public's attitude towards public schooling, Rose and Gallup (2000; 2002) found that only 30% of people were in favor of having their children participate in virtual charter or online schooling unless it was within

the context of a brick-and-mortar school. Clark and Berge (2005) argued that concerns that virtual schooling will reduce the amount of funding available to public schools or replace teachers in brick-and-mortar schools were largely responsible for the current attitude.

The remaining two challenges outlined by Berge and Clark (2005) were student readiness issues and retention issues. Both of these issues were illustrated in a series of studies funded by NCREL two years ago into various quantitative aspects of virtual schooling across the United States. One of these studies examined student success in a secondary school algebra offered through the FLVS. Cavanuagh, Gillan, Bosnick, Hess and Scott (2005) found that students in the virtual school course performed better on a non-mandatory assessment tool than students from the traditional classroom. The authors also revealed, however, that there were a higher number of virtual school students who completed the assessment and speculated that the virtual school students who did take the assessment may have been more academically motivated and naturally higher achieving students. This potential limitation was consistent with the findings of Rosenthal and Rosnow (1975), who in their literature review of the studies that relied upon volunteers as subjects found that volunteers "are likely to show higher levels of achievement that their less achievement-motivated colleagues" (p. 40) and "although there are a good many results (15) showing no relationship between volunteering and intelligence, there are even more (20) showing volunteers to be significantly more intelligent, while only 2 results show volunteers to be significantly ($p < .10$) less intelligent" (p. 66). Essentially those who would complete a non-mandatory assessment would be those who had a greater desire to achieve and who were more likely to succeed in school.

In a similar NCREL study of student performance in algebra between virtual school and traditional classroom students, McLeod, Hughes, Brown, Choi and Maeda (2005) found that the virtual school students performed better on an assessment of algebraic understanding than their classroom counterparts. These authors speculated, probably accurately, that the reason was due to the high dropout rate in virtual school courses. Simply, many of the low-achieving virtual school students had already been removed from the sample prior to the assessment. They also indicated that the majority of virtual school students in the sample were doing the course for the second or third time, so familiarity with the content and the motivation to take advantage of their "last chance" were also potential factors in the differences that were found.

In these studies the low retention or high attrition rates are pointed to as factors influencing the outcome of the comparison. This problem, while better documented at the post-secondary level (see Moore, 2001), is a common one for virtual schools. Clark, Lewis, Oyer and Schreiber (2002) found that the IVHS had a completion rate of only 53% during its first year of operation and 80% the following year. In their evaluation of the FLVS, Bigbie and McCarroll (2000) found that over half of the students who completed FLVS courses scored an A in their course and only 7% received a failing grade. However, they also found that between 25% and 50% of students had dropped out of their FLVS courses over the previous two-year period. These findings lead one to wonder, as McLeod et al. (2005) did earlier, if all of the low-achieving students had already dropped out of their courses. The nature of students who are served by virtual schools has been a consistent discussion in the literature. Clark et al. (2002), in his evaluation of the IVHS found that students who were "highly motivated, high achieving,

self-directed and/or who liked to work independently" typically did well in the online environment (p. 41). This was consistent with the characteristics of the student Stevens (1999b) described earlier. Both of these descriptions are also consistent with the characteristics more often attributed to adult learners, who according to Knowles (1970) are more self-directed and independent in their orientation to learning than adolescents.

These findings were supported by the work of SRI International and their five-year evaluation of the VHS. The VHS is the oldest and most researched virtual school in the United States. In their first year evaluation of the VHS, Kozma, Zucker and Espinoza (1998) found that the vast majority of students in their courses were planning to attend a four-year college. They also reported that two thirds of the teachers indicated that the VHS students were less likely to drop out of school than students in their classroom-based courses. These findings led the evaluators to conclude that "the current VHS curriculum [was] dominated by advanced courses that cater to students who are successful, independent, and college bound" (p. 49). The following year, Espinoza et al. (1999) reached similar conclusions when they stated that "VHS courses are predominantly designated as 'honors,' and students enrolled are mostly college bound" (p. 49). These finding were not surprising to the evaluators, as they indicated that the VHS' own faculty handbook promoted this kind of selectivity when it stated: "Although all students should have access to the VHS catalog, we recommend that the school site coordinator and guidance counselors select students who can work independently and handle responsibility" (p.50).

In both the Clark et al. (2002) and the Espinoza et al. (1999) evaluations, the authors recommended that the virtual school take steps to increase the range of students

served. During the third year evaluation of the VHS, Kozma et al. (2000) took a slightly different approach and focused upon four classes as a case study of the VHS model. The four courses selected were Advanced Placement Statistics, Modern Classics, Photographic Vision, and Pre-Engineering and Design. The students from these classes were described by their teachers as very capable academically and college bound. However, even with this selectivity the evaluators still found a higher dropout rate for these four VHS courses than for the face-to-face comparison groups. To summarize their five-year evaluation of the VHS, Zucker and Kozma (2003) released the book *The Virtual High School: Teaching Generation V*. In this volume, they reported that students who were not expected to succeed in the VHS environment were discouraged from taking VHS courses and that more than four out of every five students in VHS courses were college preparatory.

Issues of student selectivity had also been found in evaluations of virtual schools in Canada. Haughey and Muirhead (1999), in their examination of online learning in the province of Alberta, described the preferred characteristics of K-12 students involved in virtual schooling to include the highly motivated, self-directed, self-disciplined, independent learner who could read and write well, and who also had a strong interest in or ability with technology. Later in their evaluation of student achievement and performance in online learning in Alberta, Ballas and Belyk (2000) found that the performance of virtual and classroom students were similar in English and Social Studies courses, but that classroom students performed better overall in all other subject areas (i.e., Biology, Chemistry, Mathematics, and Physics). The authors also indicated that the participation rate in the assessment among virtual students ranged from 65% to 75%

compared to 90% to 96% for the classroom-based students. This led them to speculate, probably quite accurately, that the sample of virtual school students did not reflect the total population of these students. While not discussed by the authors it is plausible that the 15%-25% difference in participation rate reflected all of the low-achieving students, as was raised by McLeod et al. (2005). This would indicate that in the majority of courses examined the virtual school students had lower achievement levels, even with a more selective group of students. At present, there has been little or no research into the reasons for the poor performance of these highly skilled and more motivated students. Speculation has been that the learning experience provided by virtual schools was not at the same caliber as the learning experience that classroom-based students have received – although there is also no research to support this potential cause. The following year, Barker and Wendel (2001) reported a comparison of performance between students attending six virtual schools and three conventional schools from three different provinces over a three-year period. Their findings were that students in the six virtual schools performed no worse than the students from the three conventional schools at both the grade nine and grade twelve levels. Again, even with a more selective group of students in the virtual school, the performance of the virtual school students did not exceed that of their classroom counterparts.

The findings, in both Canada and the United States, of high attrition rates in virtual school courses and no significant differences in comparative studies (or differences that may be explained by the selectivity of students in the virtual school courses), may be partially explained by the fact that many of the virtual school opportunities are based upon the practice of distance education with adult learners. Until

very recently, relatively little was known about these factors in K-12 contexts because historically the practice and research into distance education and online learning had been focused upon adult populations, such as those found in post-secondary institutions or Corporate America. This focus upon adult learners was the source of some of the challenges faced by those engaged in virtual schooling, both in the design and delivery of distance education to K-12 students. While the practice of virtual schooling has been around for little more than a decade, the practice of distance education has been around for well over a century, with universities becoming engaged in correspondence programs in the late 1800s and K-12 schools taking part in distance education using educational radio in the 1930s. While literature in the field has largely been devoted to defining distance education itself, researchers also attempted to identify theories to explain how the field worked (recent examples include Edwards, 1995; Keegan, 1988; Rumble, 1989; Simonson, Schlosser, & Hanson, 1999). Unfortunately, theory in the field has largely been based upon adult learners engaged in independent study courses (e.g., Moore, 1972; Peters, 1967; Wedemeyer, 1981) rather than on K-12 students.

The trend of the theory of distance education focusing upon an adult population has also spilled over into other forms of the literature. For example, in the second edition of the Association for Educational Communications and Technology's *Handbook of Research on Educational Communications and Technology*, the only reference that Gunawardena and McIsaac (2004) made to the K-12 system in their chapter on distance education is a two-paragraph discussion on the use of personal digital assistants in distance education (pp. 369-370). In the *Handbook of Distance Education*, only one of the fifty-five chapters is devoted to distance education in the K-12 environment (Moore

& Anderson, 2003). Earlier, as a part of their nine-year literature review of the *American Journal of Distance Education*, Koble and Bunker (1997) found that there had only been a minor shift in the original emphasis upon adult and continuing education to reflect the growing interest in distance education in public schools.

The most widely accepted theory of distance education at present is the theory of transactional distance (Moore, 1972, 1973, 1983, 1993a; Moore & Kearsley, 1996b). Like most other theories of distance education, this theory was intended for adult learners. Based upon the work of Malcolm Knowles, one of the founders of the field of adult education, Moore conjectured that it was natural for an adult learner to exhibit autonomous behavior, which was why distance education programs should seek to have a low level of transactional distance (i.e., a high level of dialogue and a low level of structure) to maximize the opportunities for the autonomous adult learner. Knowles (1970) stated that there were four assumptions about adult learners that were different than the assumptions about child learners:

> 1) his self-concept moves from one of being a dependent personality toward one of being a self-directing human being; 2) he accumulates a growing reservoir of experience that becomes an increasing resource for learning; 3) his readiness to learn becomes oriented increasingly to the developmental tasks of his social roles; and 4) his time perspective changes from one of postponed application of knowledge to immediacy of application, and accordingly his orientation toward learning shifts from one of subject-centeredness to one of problem-centeredness. (p. 39)

Moore (1973) himself speculated that even though the quality of autonomy, based upon Erikson's stages of development, emerges in infancy, that this ego quality may not be the same as autonomy of learning and that "it may well be that, as learners, people are struggling in an 'autonomy versus shame and doubt' crisis in grade school, high school, or university" (p. 667). Even Bright (1989), in his critique of adult learning theory, stated "it is not being suggested that there are no differences between adults and children. On the contrary, there are probably many…" (p. 55). All of these researchers and theorists agree, there are fundamental differences in the orientation that adults have to learning compared to the way in which children and adolescents learn.

Unlike the education of adult learners, Vygotsky (1962) observed that learning for a child was a social process that focused upon interaction within a zone of proximal development. The zone of proximal development "is the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). Cavanaugh et al. (2004) suggested, "since adults have progressed through these stages of cognitive development, delivery of web based education at the adult level need not concentrate on methods that help the learner develop these cognitive skills" (p. 7). The methods designed to help the child learner develop cognitive skills are intended as guidance provided to these learners to ensure that they remain in the zone of proximal development.

Moore (1973) noted that typically in K-12 education teachers were expected to maintain control of the content and method of delivery within the classroom. These students "should not be compelled to assume a degree of autonomy they are not ready to

handle, and so it is customary in child education for the preparatory and evaluation processes to rest entirely in the hands of the teacher" (p. 84). According to adult education experts, children are not ready to assume high degrees of autonomy, and thus child and adolescent learners require more structure in their educational settings, particularly in distance education settings (such as virtual schools) where the lack of proximity to the teacher decreases one of the main sources of guidance to the learners in their zone of proximal development. The addition of structure to support the child learner in a virtual school environment may serve to replace some of that guidance.

Due to these differences, Wedemeyer (1981) came to the conclusion that the major problem for rural students, who were engaged in any form of distance education (including virtual schooling), would be that:

> the person who learns through technology is not only physically distant from the teacher… he is also as a learner required to be more responsible and more autonomous. The traditional learner dependency sets believed and practiced by teacher, and required by learners in schools, come apart when the teacher and learner are physically distant from each other. (p. 111)

Unfortunately, the research into an alternative design principles that caters to rural secondary students has only just begun (see Barbour, 2005a, 2005b; Barbour & Cooze, 2004; Cooze & Barbour, 2005) and recommendations are still preliminary at this time. These realities have led one rural education scholar to wonder if web-based distance education may not be suitable for all secondary-level students (Mulcahy, 2002). A summary of these challenges is presented in Table 2.4.

Table 2.4. Summary of the challenges of virtual schooling

Challenge	Reference
High start-up costs associated with virtual schools	Berge & Clark (2005); Morris (2002)
Access issues surrounding the digital divide	Berge & Clark (2005)
Approval or accreditation of virtual schools	Berge & Clark (2005)
Student readiness issues and retention issues	Ballas & Belyk (2000); Barker & Wendel (2001); Berge and Clark (2005); Bigbie & McCarroll (2000); Cavanuagh et al., (2005); Clark et al., (2002); Espinoza et al. (1999); Haughey & Muirhead (1999); Kozma, Zucker & Espinoza (1998); McLeod et al., (2005); Zucker & Kozma (2003)

Future Research into Virtual Schooling and Rural Education

Based upon the historical focus of distance education research on adult populations and the concerns over student selectivity in K-12 distance education opportunities, recently there have been calls for additional research into distance education at the K-12 level in general and, specifically, into virtual schooling. For example, Cavanaugh (2001) concluded that research at the post-secondary level may not be relevant to the K-12 experience and called for more research into virtual schooling to ensure that the practice was being implemented in a manner that would be effective for K-12 learners. This was consistent with Gallini and Barron (2001-2002) who, in their call for a new research agenda, stated that the use of distance education technologies for instruction and learning, such as virtual schooling, was surpassing the collection of useful data to test the effects of the tools. This is particularly noticeable with the vast amount of virtual school literature being based upon the experience of practitioners rather than on research studies.

More specifically, Clark (2003) recommended that future research "demonstrate the impact of distance and virtual learning on K-12 student academic performance [and a] delineation of factors that increase success rates for all K-12 learners in their distance and virtual learning experiences" (p. 693). For example, in a recently NCREL funded study, Dickson (2005) found that there was a high degree of correlation between a student's total number of clicks and their final score in the course. Using this as an example of how relative simple data generated by most course management systems can be useful, Dickson also recognized the need for additional "research on factors contributing to success of students" (p. 60). This call for research into the factors affecting student success has been a common one in recent years. Butz (2004) also recommended further research into the factors that contribute to why some learners are more successful in online environments than other learners. In their NCREL study, McLeod et al (2005) challenged researchers to examine the specific factors that may impact student achievement in virtual school environments. In the same series of NCREL studies, Dickson (2005) recommended further research into factors contributing to student success.

This has been consistent with, although somewhat more specific than, the calls for more research on the effects of technology, particularly distance education, on rural schooling. This was exemplified by Howley (1997), who suggested that research is needed that considers "the particularities (and not the generalities)" of rural schooling (p. 132). More specifically, in their study of 196 doctoral dissertations in rural education from 1989 to 1993, Harmon, Howley and Sanders (1996) found that there were fewer dissertations completed on the use of technology in rural schools than any of their other

five categories. They also noted that there were no dissertations at all found on "(a) identification of schools using advanced technology, (b) impact of technology on curriculum, cost-effective studies, (c) level of private support, or (d) low-cost alternatives to current telecommunications" (p. 73). In both the distance education and rural school literature, there have been calls for more research into the effects of distance education, such as virtual schooling, on rural schools. More specifically, research into the factors that affect student success in these types of environments is sorely needed.

Chapter Summary

I began this chapter by indicating that I would use the existing literature to answer six questions:

1. How are the needs of rural schools different from the needs of urban schools?
2. What are some of the ways that rural schools have attempted to address these needs?
3. How are virtual schools and virtual school students described in the literature?
4. What are some of the benefits of distance education/virtual schooling for rural schools?
5. What are some of the challenges of distance education/virtual schooling for rural schools?
6. What research is needed to extend the benefits and meet the challenges of distance education/virtual schooling for rural schools?

To summarize this review, there are many differences between rural and urban schools. The differences most prominent in the literature are the inequity of curriculum offerings available to rural school students and the inability of rural schools to attract and

retain highly qualified teachers (particularly in high demand or specialized subject areas). While school consolidation was utilized as a way to address the problem of small, rural schools, distance education has become the more common method used in the past two decades, with virtual schooling being the most employed method of distance education used by rural schools today. Virtual Schooling seems to be a viable solution to the curriculum inequalities presented by rural schools.

The most accepted definition of a virtual school is an entity, which has been approved or accredited by a state or governing body within the state, that offers secondary-level courses through distance delivery – most commonly using the Internet. While virtual schools can be classified in different ways, the three most common methods of instructional delivery are by independent, asynchronous or synchronous means. Unlike what may be portrayed in the popular media, there appear to be few generational differences in today's students who take advantage of these virtual schooling opportunities. However, even if there were generational differences the realities of access to technology and the Internet in rural areas would negate these inherent differences. To date, the vast majority of virtual school students have tended to be a very select group of academically capable, motivated, independent learners.

Proponents of virtual schooling have concluded that there are a number of benefits associated with virtual schooling. These benefits can be summarized into five main areas: expanding educational access, providing high quality learning opportunities, improving student outcomes and skills, allowing for educational choice, and achieving administrative efficiency. However, whether these benefits are actually realized through

virtual schooling remains in doubt in the minds of some critics, and the research to support these conjectures is limited at best.

Along with the benefits, there are also a number of challenges associated with virtual schooling for rural schools. Over the past decade, there have been numerous studies that have shown that the only students that are typically successful in online learning environments are those who have independent orientations towards learning, who are highly motivated by intrinsic sources, and who have strong time management, literacy, and technology skills. These characteristics are ones that are typically associated with adult learners. Some of these challenges stem from the fact that the research into and practice of distance education has typically been targeted to adult learners. The problem with this focus upon an adult population is that adults learn differently than children and adolescents. This has led many researchers to call for more research into the factors that account for K-12 student success in distance education and virtual school environments. My research directly addresses this gap in the research literature.

Chapter 3: Methodology

The purpose of this study was to examine the nature of web-based learning in Newfoundland and Labrador secondary education. Other studies have reported on the outcomes of web-based learning in a variety of secondary education contexts, but none have sought to describe in great detail what students actually do when engaged in learning in this type of online learning environment. Specifically this study sought to understand how students interacted with their web-based courses and the process they undertook when they needed help. Initially, I proposed the following research questions:

1. What are the students' experiences during their synchronous time online?
2. What are the students' experiences during their asynchronous time online?
3. What is the nature of the assistance students seek?
4. After students feel they have successfully mastered a piece of content, what do students attribute their success to?

During the data collection process it became apparent that the instruments being used (particularly the various interview protocols – see Appendices A-D), while aligning to the purpose of the study, did not adequately address questions three and four as they were originally written. The original intent of questions three and four was to examine students' process of gaining assistance when students encountered difficulties. At the beginning of the research process, I was unsure whether these difficulties would be technical, content-based, related to learning in an independent virtual environment, or a

combination of more than one of these factors. Based on the purpose of the study, these two research questions could have been more appropriately phrased as "What does the process of getting help look like for these students?" and "What factors contribute to the process of assisting students?"

The original wording of questions three and four did not focus enough on how students navigated the online support process. Based on my impressions during the first two rounds of interviews and throughout the observation period, the answer to question three as originally stated was simple: students sought assistance based upon questions they had about the content and clarification that they needed to complete assignments that would be graded. For example, a single student reported asking for technical assistance only once during the first two rounds of interviewing (i.e., after the first twenty-one interviews with eleven different students). Further, during data collection, students shared why they chose one support mechanism over the other. I became interested in examining whether a pattern existed about students' selection of support during their online courses.

Question four, in its original form, required data that was more specific than the data collected with these instruments, specifically with regards to how students defined success and the factors that contributed to their own definition (see Appendix E for samples of how students chose to define success). Simply put, the interview questions that were prepared as a part of the semi-structured protocol, and even the follow-up questions that I would ask the students, did not elicit much data related to the fourth question. This may have been a flaw in the initial design of the interview protocol. However, at that particular stage in my data collection process I chose to treat it as an example of a poorly worded question. Thus, while transcribing my interviews and field

notes, I felt the need to reframe question three and remove question four in light of my initial findings. Therefore, the study's revised research questions were:

1. What were the students' experiences during their synchronous time online?
2. What were the students' experiences during their asynchronous time online?
3. When students required content-based assistance, where do they seek that assistance and why do they choose those sources?

Design of the Study

Reeves (2000) described six different goals for research in the field of educational technology: theoretical, predictive, interpretive, postmodern, development, and action. My goal was primarily interpretive because I sought to portray "how education works be describing and interpreting phenomenon" (p. 23). LeCompte and Preissle (1993) contended that interpretive research is primarily concerned with meaning and that this type of research is typically concerned with explaining a specific phenomenon.

Since my research questions aimed to yield a richer understanding of the participants' experiences, qualitative research methods were appropriate as the primary framework for data collection (Crotty, 1998). The specific qualitative method I applied was the case study method. Merriam (1998) indicated that a case study is designed to provide "an intensive, holistic description and analysis" of a specific phenomenon (p. 27). This is supported by Shank (2002), who described the main purpose of a case study as to gain an understanding of a unique case. Stake (1995) described a case study as concentrating on one phenomenon, which possesses both "uniqueness and commonality" (p. 1). Further, Yin (2003) discussed how a case study is appropriate to address questions of how and why – such as "How do students learn in this environment?" or "Why

students select one form of assistance over another in this environment?" As the research questions that I attempted to answer were designed to understand students' experiences in a virtual high school by examining how it operated at a particular rural school, a qualitative case study (Stake, 1995) was the most appropriate methodology.

Further, Yin (2003) indicated that a case study is useful in investigating a phenomenon within its own context, and where the boundaries between the phenomenon and the context are unclear. Patton (2002) stated that a single case study typically consists of smaller cases that provide the stories of the larger case. In the present study, the smaller cases that constitute the story of this case study were the individual students at Beaches All Grade school who were engaged in courses offered through the Centre for Distance Learning and Innovation (CDLI). Yin (2003) would describe this as a single case study with twelve embedded units of analysis (i.e., the twelve students).

Stake (2000) would label the proposed type of case study as an instrumental case study; the goal was to advance an understanding of a broader context (i.e., what does online learning look like for students in web-based learning environments?) through a detailed analysis of a single case (i.e., students at one rural school within the CDLI). According to Stake (1995), the distinguishing feature of an instrumental case study is the desire to utilize a single case to gain a better understanding of a larger phenomenon, as opposed to an intrinsic case study which is less interested in the larger problems and more interested in what can be learned about this single case. This is consistent with Merriam's (1998) description of a particularistic case study, which focuses on the case as a mechanism for revealing insights into the phenomenon. While qualitative researchers typically shy away from making generalizations due to the small sample size that is

typically associated with their individual studies, Bassey (1999) describes how case studies can be used to make "fuzzy generalizations [arising] from studies of singularities and typically claims that *it is possible, or likely, or unlikely that* what was found in the singularity will be found in similar situations elsewhere" (emphasis in original, p. 12). It was my intention to be able to make fuzzy generalizations about what online learning looks like for rural school students in this web-based learning environment based upon this single case study.

The Research Setting

To meet the parameters of the study, a school in a rural area was chosen as the research setting. Beaches All Grade has approximately 100 students and a staff of fifteen teachers. The current school building was actually the combination of an elementary school and a high school that were joined in the middle by a gymnasium. However, these two former schools were only built in the 1960s, both replacing smaller one and two room schools that had existed in the four smaller communities that once made up the current community of Beaches. The students at Beaches All Grade came from three different communities: Beaches itself, Cape Random (approximately 7 miles away south) and Clarke's Bay (approximately 7 miles away north). All three of these communities were first settled in the late 1700s or early 1800s as the migratory fishery began to expand. The three communities combined included approximately 950 residents. The fishery continued to be the main industry supporting the residents of these communities, although a seasonal tourism industry had also begun to develop in the past decade.

During the 2005-06 school year there were twelve students enrolled in eight different CDLI courses. Table 3.1 provides the demographic information for each student.

Table 3.1. Student participants

Student Pseudonyms	Gender	Grade	Community From	Courses Taken
Jasmine	Female	10	Cape Random	Fine Arts[4]
Justine	Female	11	Beaches	Language Arts[5] Mathematics Science
Constance	Female	11	Beaches	Language Arts
Jason (JD)	Male	11	Clarke's Bay	Language Arts Mathematics
Mya	Female	12	Beaches	Language Arts
Max	Male	12	Beaches	Language Arts Science Mathematics
Kathy	Female	12	Cape Random	Language Arts Science Mathematics
Peter (PJ)	Male	11	Beaches	Mathematics Science
Darlene	Female	12	Clarke's Bay	Language Arts
Dayna	Female	12	Beaches	Language Arts
Kevin	Male	12	Clarke's Bay	Fine Arts
Norah	Female	11	Beaches	Mathematics Science

Chapter Four is devoted to a longer contextual description of the province of Newfoundland and Labrador, the challenges that it has faced in providing educational opportunities in rural areas, the history of distance education as a means to address that challenge – including a description of the CDLI and the nature of its online learning experience. Beaches All Grade and the communities that it served, along with these twelve students, are also described in greater detail.

[4] Fine Arts include courses in art and music.
[5] Language Arts include courses in both English language arts and French as a second language.

Data Collection Techniques

A case study is typically well aligned with ethnographic methodologies, at least in terms of using similar methods of data collection and analysis (Stake, 2005). A case study, by definition, involves the close examination of a single entity over a short or long period of time (Hays, 2004). According to Merriam (1998) "any and all methods of gathering data, from testing to interviewing, can be used in a case study, although certain techniques are used more than others" (p. 28). Those techniques usually included interviews, document analysis, and participant observation (Bassey, 1999; Merriam, 1998; Stake, 1995; Yin, 2003).

The use of multiple methods for data collection allows researchers to triangulate any themes that may emerge from the data. Stake (1995) defined triangulation as "working to substantiate an interpretation or to clarify its different meanings" (p. 173). Triangulation is typically accomplished by using both multiple sources of data and multiple data collection methods (see Bogdan & Biklen, 2003; Patton, 1990). Also, as in any qualitative research study, the use of multiple methods also increases the researcher's ability to provide the rich description associated with qualitative inquiry.

For this study, the main methods of data collection were semi-structured focus groups and interviews, participant observations, written participant reflections, and surveys. Table 3.2 illustrated how each method was used as a primary or secondary source of data to address the research questions.

Table 3.2. Alignment of data collection techniques with specific research questions

Research questions	Primary Data	Secondary Data
Q1 – What are the students' experiences during their synchronous time online?	Monthly telephone interviews with students In-school observations	Observation of synchronous teaching Interviews with teachers Focus group Surveys
Q2 – What are the students' experiences during their asynchronous time online?	Monthly telephone interviews with students In-school observations	Observation of asynchronous teaching Interviews with teachers Focus group Surveys
Q3 – When students require content-based assistance, where do they seek that assistance and why do they choose those sources?	Monthly telephone interviews with students Weekly journal entries	In-school observations Interviews with teachers Observation of synchronous tutorials Focus group Surveys

Multiple methods were utilized as primary and/or secondary sources to address each of the research questions. According to Lawrence-Lightfoot and Davis (1997), methodological triangulation assists in the analysis phase, particularly in making it easier to discover and verify themes from the different sources of data.

The data collection phase of this study took place from January to August 2006 (see Table 3.3 for an overview of the timeline of data collection). In January 2006, I traveled to Canada to spend a week at Beaches All Grade to meet with students taking CDLI courses and their parents/guardians. It was hoped that this visit would allow me to obtain signed consent forms from the students and their parents or guardians; however, the closure of the school for three of those five days due to inclement weather meant that I was only able to get a small percentage of the signed forms collected. The remaining forms were collected by the school's principal and I received them in February.

Table 3.3. Descriptive timeline of data collection techniques

	Focus group	Weekly student journal entries	Monthly student interviews	Observe CDL1 students	Surveys	Interview teachers & administrators	Observe asynchronous & synchronous classes & tutorial sessions
Jan	3 students						
Feb		1 entries each	1 interview each				
Mar		5 entries each	1 interview each				
Apr		3 entries each	1 interview each				
May		4 entries each	1 interview each	23 synchronous classes in 7 different courses 11 asynchronous classes in 7 different courses	4 different surveys completed by 12 students each	1 interview with 3 different teachers 1 interview with 2 different administrators	
Jun		2 entries each					1 synchronous tutorial sessions 3 asynchronous course sites from 2 different subject areas
Jul							27 synchronous classes in 13 different courses
Aug							10 asynchronous course sites from 9 different subject areas

Focus Group

According to Morgan (1997), focus groups are useful for obtaining descriptive data from a number of different participants in a single session. Similar to interviews, focus groups also allow researchers to learn about the perceptions, feelings and attitudes of the participants. Finally, focus groups allow the researcher to analyze different perspectives within a social group of the same events (Kitzinger & Barbour, 1999). A month after visiting Beaches, I conducted a focus group with three CDLI students (i.e., Justine, Connie, and Jason). Due to participants' schedules, these three participants represented the maximum number of CDLI students that I could meet with at one time.

This focus group was conducted using the *Elluminate Live*® software that the students use for their online synchronous classes (see Figure 3.1). The focus group was also recorded using the internal feature within this software and then transcribed.

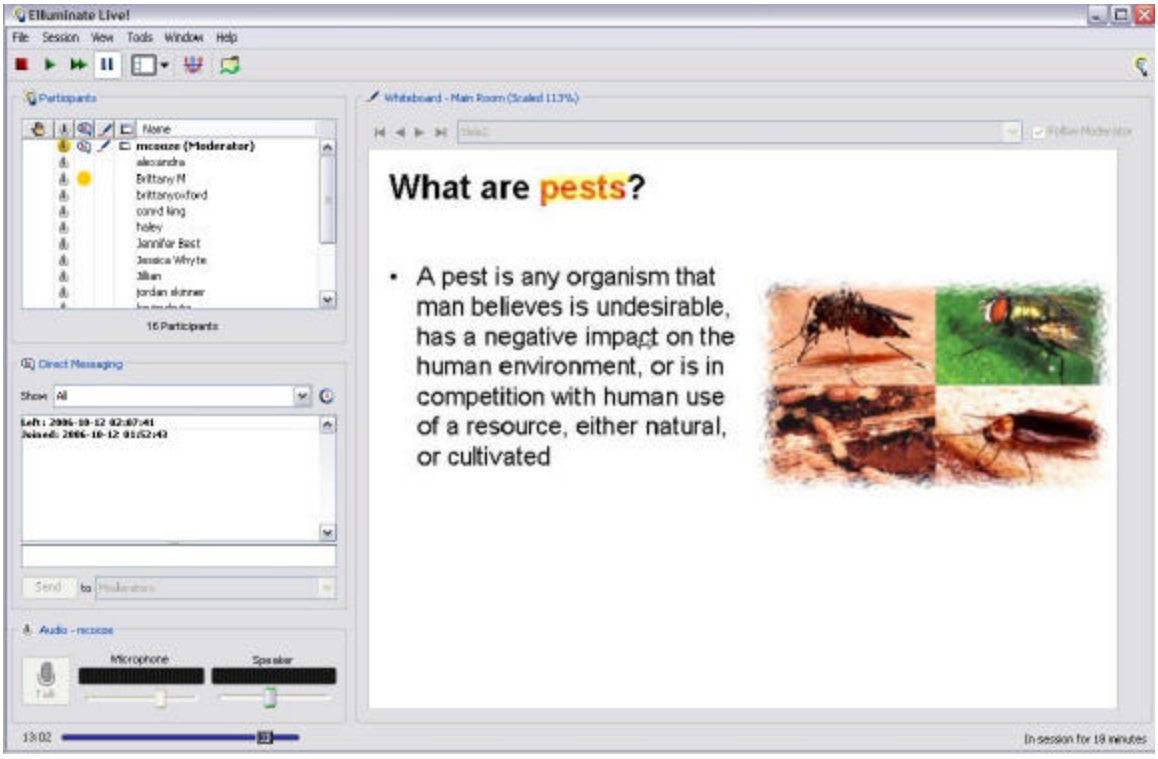

Figure 3.1. Screen shot of *Elluminate Live*

Anderson and Kanuka (2003) describe a number of technology-assisted data collection techniques; including the use of "synchronous net-based focus groups" (see pp. 102-119). The authors indicate that one of the main benefits of these online focus groups is the elimination of costs. The purpose of this semi-structured focus group was to examine students' work habits in their CDLI courses and where they generally sought help (a copy of the focus group guide can be found in Appendix F). However, the focus group also gave me a better sense of the culture of distance education in this school and the culture of the school in general. This was important for me as an outsider who entered the research setting during the middle of the school year.

This online focus group was recorded and transcribed verbatim. After completing the transcription, I solicited an external individual to listen to each tape and compare it to the transcript to ensure the accuracy of the transcript. I used two methods of member checking to confirm the contents of the transcript. Patton (2002) indicated that researchers "can learn a great deal about the accuracy, completeness, fairness, and perceived validity" of the data by having participants review both transcripts and findings (p. 560). This was consistent with Bassey (1999), who suggested that the trustworthiness of the data is improved when participants have the opportunity to review transcripts. Given that my participants were adolescents, I was concerned that typical methods of member checking (e.g., sending a copy of the transcript for additions, deletions, and clarifications) would not be completed by these individuals. Based upon this concern, I transcribed the focus group prior to the student interviews. This provided me with the opportunity to question both the three students who participated in the focus group, but also other students about any of the comments that were made. I also sent the three

participants a copy of the transcript from the focus group with the invitation to add, delete, or clarify anything in the document. All three students reported that they read the transcript, however, none of the students made additions, deletions, or clarifications.

Interviews

Following this initial focus group, I began monthly interviews with eleven of the twelve CDLI students (one student initially only wanted to participate in the observations of the study – more information about this student is provided later in the document). These interviews were semi-structured in nature. I used a series of informal interview guides (see Appendices A-D). In addition to these guides, I also used information that the students wrote in their weekly journal prompts as an additional source for asking questions of them. Semi-structured interviews allowed me to discuss a greater breadth of topics than more structured interviews (Fontana & Frey, 2000). The use of semi-structured interviews was also important due to the fact that the majority of interviews took place with adolescents. Eder and Fingerson (2001) indicated that during interviews with adolescents it is important that the method provide "the most natural way for them to communicate social knowledge to others" (p. 183). The use of a semi-structured interview guide allowed for a natural flow to the interaction (Patton, 2002), asking them follow-up questions based upon their own words, while still ensuring that certain topics were covered by the end of the interview.

Due to my distance from Newfoundland and Labrador, the research design had to include telephone interviews. As Weiss (1994) suggested, telephone interviews tend not to be as useful as in-person interviews, but are the next best thing to being there. In a comparison of telephone vs. in-person interviews, Shuy (2001) indicated that one of the

main advantages of telephone interviews is greater cost-efficiency. This was certainly of primary concern to me as I planned this study. Like Weiss, however, Shuy also indicated that when judged using the same criteria, in-person interviews tend to elicit greater detail.

Each interview was tape recorded and transcribed verbatim. After completing the transcription, I solicited an external individual to listen to each tape and compare it to the transcript to ensure the accuracy of the transcript. In addition to the accuracy of the transcription, similar to the focus group, I sent participants copies of the transcripts from their interviews with the invitation to add, delete, or clarify anything in the document. Seven students reported that they read some their transcripts, but only three students reported that they had read all of their transcripts. None of the students made additions, deletions, or clarifications.

One of the difficulties I experienced early into the first round of interviews dealt with the nature of my semi-structured interview protocol (see Appendix A). The single protocol that had been developed and approved did not adequately address the overall goal or purpose of my dissertation study. During the first round of interviews I modified the original interview protocol slightly and then created three additional protocols (see Appendices B-D) – keeping the main areas of inquiry constant, but adding questions based upon data that had been collected from the focus group, the initial interviews, and the early journal entries.

In instances when the research is exploratory, Benbasat, Goldstein and Mead (1987) recommended using a single case as a pilot study. The changes required in the interview protocols, along with the re-write my research questions, might not have been necessary had I completed a pilot study. Lancaster, Dodd and Williamson (2004)

indicated that testing the various forms and instruments of data collection is one purpose of a pilot study, while Maxwell (2005) stated that "pilot studies serve some of the same functions as prior research, but they can be focused more precisely on your own concerns" (p. 56). In this instance, a pilot study would have allowed me to test the ability of my interview protocol to generate data that addressed my research questions and any changes that were required could have been made prior to my dissertation study.

Another difficulty I experienced was the length of time between interviews. My initial plan was for each student to be interviewed four times, with each interview taking place four weeks after the previous one. With some minor exceptions, this was what occurred during the first two rounds of interviews. However, this was not the case for the third and fourth rounds of interviews (see Table 3.4).

Table 3.4. Dates of and time between each student interview

Student	Inter. 1	Time	Inter. 2	Time	Inter. 3	Time	Inter. 4
Jasmine	08 Mar	36 days	13 Apr	20 days	03 May	29 days	31 May
Justine	22 Feb	28 days	22 Mar	42 days	03 May	22 days	24 May
Constance	28 Feb	30 days	30 Mar	37 days	04 May	40 days	12 Jun
Jason	01 Mar	28 days	29 Mar	35 days	01 May	45 days	14 Jun
Mya	23 Feb	28 days	23 Mar	40 days	*02 May*[6]	23 days	*24 May*
Max	25 Feb	29 days	26 Mar	41 days	*04 May*	23 days	*26 May*
Kathy	02 Mar	28 days	30 Mar	25 days	25 Apr	31 days	25 May
Peter	09 Mar	25 days	03 Apr	59 days[7]			31 May
Darlene	07 Mar	28 days	04 Apr	37 days	10 May		[8]
Dayna	07 Mar		[9]				
Kevin	07 Mar	28 days	04Apr		[10]		
Norah	24 May[11]						

[6] Interview dates in italics indicate that these were conducted in person, as opposed to over the telephone.
[7] Due to Peter's work schedule and various school related activities, we were unable to successfully schedule this third interview.
[8] Darlene simply failed to be available when I called and did not respond to requests to re-schedule the final interview.
[9] Dayna indicated after missing her second interview that she did not want to participate in the interview portion of the data collection process.
[10] Kevin simply failed to be at home when I called and did not respond to requests to re-schedule the final two interviews.

As indicated in Table 3.4, a delay or rescheduling of interviews was a part of the process. Most often this occurred because the students simply failed to be at home and/or did not have the telephone line free for me to reach them. In other instances the participants were traveling for school-related activities or these activities meant that it was an inconvenient time for them to spend thirty to sixty minutes on the telephone with me. Finally, in some instances my own schedule made it impossible for me to call them. As a result of the delays and rescheduling, some interviews had to be conducted in person, which may have caused some variation in the nature of their response. It also meant that some interviews did not take place. Finally, the irregular scheduling of interviews during the third and fourth rounds also meant that students either had so many events to discuss or so few events to discuss that they provided less information in response to my questions than they had in previous interviews.

While there were many similarities with the questions included in the semi-structured interview guides, the general exception was with the fourth interview guide which asked questions of the students about their experiences over the course of the complete school year (as opposed to "over the past month"). My inability to interview each of twelve students on all four occasions led to the decision to focus the analysis of my interview data on only eight students: Jasmine, Justine, Constance, Jason, Peter, Mya, Max, and Kathy. Seven of these eight students were selected because I was able to interview them on all four occasions. Peter was selected because I was able to interview him during two of the first three rounds and also for the final round. It was important that

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[11] Norah initially declined to participate in the study, but then decided to only participate in the in-school activities. She did agree to be interviewed once to allow me to get enough information to describe her in the following chapter (see Appendix G for a copy of the interview protocol used for this interview).

Peter was interviewed during this fourth round, as it allowed me to get a sense of Peter's experiences over the past year. Darlene, who I was also able to interview three times, was excluded because I was not able to conduct this final interview (which was substantially different in content).

In addition to the student interviews, I also conducted five interviews with teachers and administrators. Throughout the first three rounds of student interviews, the students mentioned four teachers and one administrator at Beaches All Grade with whom they had interacted for the purpose of assistance with the CDLI courses. During the final week of May, while I was still in the school I interviewed three of these four teachers and the administrator. The purpose of these interviews was to verify the nature of the assistance that these teachers were providing to the CDLI students (which directly addressed research question three), how much time it occupied within their schedule, and how they viewed the operation of the CDLI in their school. In addition to these four interviews, I interviewed one of the four administrative personnel from the CDLI itself. The purpose of this interview was to explore the context of the CDLI and how that context might change in the future (see Appendices H-J). Similar to the student interviews, all five of these individuals were sent copies of their interview transcripts and asked them to add, delete, or clarify anything that they had said. While slightly better than the student response, only three reported that they took this opportunity to read their transcripts and only one made any additional, deletions, or clarifications.

Writing Journals

To supplement the monthly interviews and provide a more frequent method for the students to provide feedback on the third research question, I requested that each

student respond to a weekly prompt (see Appendix K for a draft of this prompt). Hodder (2000) indicated that the use of written accounts in research studies is important because these documents often contain more detailed accounts of an event. Hodder also stated that where the participant was not tied to the anxiety of having someone waiting for their response, as they were in an interview, they might have been more thoughtful and reflective in their written responses. It is also often the case that what people say they have done in interviews is different from what they actually did (Rathje & Murphy, 1992), so a written account that was relatively closer to the events in terms of time may have provided a more accurate description of the events.

Recognizing the level of responsibility necessary for this task and that my participants were adolescents, these prompts were typically e-mailed to the student on Thursday of each week. The e-mail message asked the student to respond to the prompt by the end of school on the following Monday. It was common for me to have to send the students a reminder Monday evening to complete their prompts and/or to remind them through their instant messenger account, as my own MSN account notified me when they logged on. The reality, however, was that this activity was only completed by approximately half of the students on a regular basis. There were also a few students that started this activity, but discontinued their participation as they got busier with their own school and work commitments. Finally, there were some students that simply failed to submit any of their entries. The student response rate for the written journals is outlined in Table 3.5.

Table 3.5. Student response rate for written journal activity by week

Student	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Jasmine	X	X	X	X	X	X	X	X		X	X	X	X	X	X
Justine	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Constance	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Jason	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mya	X	X	X	X		X	X	X	X	X	X	X	X	X	
Max	X		X	X	X	X	X	X	X	X	X	X	X	X	X
Kathy		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Peter	X	X													
Darlene		X		X	X	X	X	X	X						
Dayna															
Kevin															
Norah															

As a result of the lack of consistency in the responses, the journals were used primarily as a tool to generate questions during interviews with the students but not as a tool to generate themes during the analysis of the data.

Participant Observations

Shank (2002) describes observation as a fundamental method in qualitative research, particularly to "see those things that others have overlooked, to hear those things that others have failed to notice, and, in general, to find things that make our understanding richer and deeper" (p. 33). Marshall and Rossman (1999) echoed the importance of observation in qualitative research agreeing that observation "is used to discover complex interactions in a natural setting" (p. 107). Further, LeCompte and Preissle (1993) indicate that participant observation is a useful strategy for seeing what people do and listening to what they say, while Preissle and Grant (2004) state that participant observation is useful for capturing "the range and the variation of patterns relevant to the topic" (p. 180).

During the month of May, I traveled to Newfoundland and Labrador for a four-week period or eighteen school days to conduct participant observation at Beaches All Grade. Stringer (2004) described the ability of "providing far greater depth of understanding of the act, activities, events, interactions, behaviors and the nature of the context" as one of the main advantages of video recording observations (p. 82). As such, it had been my initial plan to both physically observe and videotape the students while they were engaged in their CDLI courses. For the first two days, I met with the students to allow them to become comfortable with my presence and talked with them about my observations. During these discussions it was near unanimous that the students preferred that I simply turn on the digital video recorder and leave the room. They felt my presence in this small room would be a continual reminder they were being observed, whereas the presence of a small digital video recorder was more easily forgotten – as evidenced by the singing, the dancing, and the topics of many conversations that were recorded during the videotaping. Their concern was consistent with concerns raised by Patton (2002) that individuals may act differently if they are aware that they are being observed. In this regard, I made the decision to simply videotape the students.

The practice that I attempted to follow was to turn the camera(s) on moments before the bell rang for the students to come into the distance education room and then wait a minute or two after the bell rang for them to move to their next class or scheduled break. This pattern was to try and remove even the visual reminder of seeing the camera(s) being turned on. Table 3.6 provides a chronological timeline of the 35 hours of classes that I videotaped.

Table 3.6. List of observations of asynchronous and synchronous classes at Beaches All Grade

Date	Fine Arts		Language Arts		Mathematics		Science	
	Synch	Asynch	Synch	Asynch	Synch	Asynch	Synch	Asynch
03 May			2		1			
04 May								
05 May								
08 May		1	1		1			1
09 May		1	1	1		1		
10 May							1	
11 May	1		1		1			1
12 May		1				1		
15 May	1							
16 May								
17 May							1	
18 May				1				
23 May	1	1			1		1	
24 May	1		1				1	1
25 May		1	1	1				1
26 May				1		1	2	
Total	5	5	7	4	4	3	6	4

One of the difficulties I experienced during this portion of the study was the interference that the schedule of activities within the school caused for the data collection. For example, the school's graduation ceremony was held on Friday, May 5, 2006 and the grade twelve students spent much of the week decorating the gymnasium. This meant that the grade twelve students (and in most instances the grade eleven and ten students) were allowed to excuse themselves from their CDLI classes (particularly asynchronous classes). A similar disruption also occurred the week of May 15-18, 2006 when all grade ten and eleven students went on a post-secondary field trip and the majority of grade twelve students decided to stay home. While this impacted how the students approached their online courses, as these courses continued on even though the students were absent

because students from other schools were still present, it also limited my ability to capture more of the students' engagement when they were online in their CDLI classes.

Another limitation that occurred due to the videotaping of the observations and not physically being present to observe was my inability to move the camera(s) with the students. An example of this was during an asynchronous class when a group of science students went downstairs to the science lab to re-do one of the experiments that they had completed earlier in the year. As the students were completing the lab, however, they ran into a problem and two of the four students went back upstairs to interrupt the in school science teacher during one is his classes to figure out where they had gone wrong. During one of their interviews, one of the students described the 8-10 minutes that the two of them spent with the in school science teacher while the students in his own classroom worked on another task. Of course, I was not able to either personally observe or videotape the interactions the two students had with their in school science teacher, as I was not physically present for the event.

In addition to observing the students' engagement in their CDLI courses, I also observed recorded synchronous classes from a variety of subject areas, along with one synchronous tutorial session. The main purpose of these observations was to allow me to become more familiar with the research context (Stringer, 2004). The specific purpose for observing the recorded synchronous sessions was to see what occurred during a tutorial session and to see how the teachers structured these classes and how they actually taught in this technology-mediated environment. Both of these types of sessions were recorded using the internal recording feature within the *Elluminate Live* software.

Along with the observation of the synchronous sessions, I also reviewed the asynchronous class material for a variety of subject areas. For their asynchronous instruction, the CDLI utilized course webs (i.e., web-based course content – primarily text and image based, although more courses are starting to include learning objects, such as video files, animations, and *Camtasia* recordings) that had been uploaded into *WebCT*. In conjunction to the actual course content, many e-teachers made use of the discussion forum, e-mail, calendar, and other features built into this course management system. The purpose of reviewing the asynchronous class materials was to see how teachers and students used this material in different course settings. Table 3.7 provides information on the teachers and tutors who provided me with permission to observe their synchronous and/or review their asynchronous instruction.

Table 3.7. List of observations of CDLI teachers and tutors classes

Teacher/Tutor Pseudonyms	Content-Area	Asynchronous (WebCT)	Synchronous (Elluminate Live)	Tutorial
Bill Martin	Language Arts	2 different course areas	3 classes from 1 course	
Lori Green-Paul	Language Arts	3 different course areas	2 classes from 2 different courses	
Pamela Bond	Language Arts	2 different course areas	2 classes from 2 different courses	
Joe Cole	Science	2 different course area	3 classes from 1 different course	
Megan Matthews	Science	2 different course areas	2 classes from 2 courses	
Dustin Nelson	Science			1 TWEP session
Norman Tiller	Social Studies	2 different course areas	4 classes from 1 course	
Pat Blake	Mathematics		7 classes from 3 different courses[12]	
Paul Murray	Fine Arts		4 classes from 1 different course	

[12] One of these synchronous classes was conducted by a substitute teacher.

I waited until after the school year had concluded in order to complete the observations of how the teacher taught during the synchronous and asynchronous time. While the teachers provided me with permission and guest account access during the course of the year, I felt that it was less intrusive if I waited until their course had been completed. By waiting, I was also able to observe a full year's activity in most of the functions of their asynchronous course material and had the opportunity to select from a full year's worth of recorded synchronous class content. In two instances, the teachers who gave permission were also the teachers of courses which the students at Beaches All Grade were enrolled (i.e., Bill Martin and Joe Cole). In these cases, it allowed me to observe some of the things that the students would have been doing on their computers, something that the videotaped observations of them were unable to capture. The reviews of the various asynchronous course material and observations of recorded synchronous classes assisted in addressing questions related to what students were doing during their asynchronous and synchronous time (i.e., research questions one and two).

Surveys

During in-school observations, I administered four different surveys to CDLI students. I was interested in further exploring why students chose the sources of assistance that they did, but also was interested in discovering why certain patterns of students' experiences in their synchronous and asynchronous time were occurring. Yin (2003) indicated that surveys are useful within a case study design to provide structured responses to many questions. Further, according to Marshall and Rossman (1999), surveys can be useful tools in obtaining data about characteristics, attitudes, and beliefs about the participants, and for making inferences about a group of participants. The four

surveys that were added to the data collection tools included: a survey measuring potential variables in transactional distance (Lowell, 2004), a high school Internet education survey (Roblyer & Marshall, 2002-2003), a learning styles inventory (Barbour & Cooze, 2004), and a survey of online learning experiences (Barbour, 2006a).

Survey to measure factors of transactional distance. The first survey that students completed measured potential factors of transactional distance, the perceived or psychological distance that a student felt existed between themselves and their instructor based upon variables of dialogue and structure (Moore, 1972, 1973, 1983, 1993b; Moore & Kearsley, 1996a) (see Appendix L). Recent research has investigated whether there are additional variables that impact the amount of transactional distance a student experiences, such as social presence, fluency, and context (Lowell, 2004); immediacy (Slagter van Tryon & Bishop, 2006); and immediacy, social presence, and solidarity (Jung, 2006). For this study I elected to utilize a modified version of the same instrument used by Lowell (2004) because I had access to both the particular instrument and the original author.

The instrument to measure potential variables of transactional distance was a combination of a transactional distance measure used by Chen and Willits (1999) which included dialogue, structure, learner independence, and perceived distance; a social presence measure developed by Short, Williams and Christie (1976); and portions developed by Lowell himself which included fluency and context. In Lowell's study, the reliability of this instrument was 0.80 using Cronbach's Alpha correlations. All of the variables included in the modified instrument that I used met this level, with the exception of the dialogue variable – which had a reliability level of 0.58 to 0.84 on the

three dialogue factors with the low level of reliability being explained by the small number of items in those factors (e.g., Chen & Willits, 1999).

High school internet education survey. The second survey was a high school Internet education survey (see Appendix M). The Educational Success Prediction Instrument (ESPRI), developed by Roblyer and Marshall (2002-2003) to "help predict which high school students would be likely to succeed in [Virtual High School] courses and provide a basis for counseling and support for other students interested in becoming online learners to help them become more successful" (p. 241) was broken into four sections or factors which included: achievement and self-esteem beliefs, responsibility/risk taking, technology skills and access, and organization and self-regulation.

In their study to test the reliability of this instrument the authors found that the reliability remained high (a = .92) and concluded "that it could be a reliable measure for predicting success of high school students in distance education environments" (p. 252). This instrument was used to determine if any of the students had deficits in any of the four areas and, if a pattern existed between the deficits that students indicated and their behavior during synchronous and asynchronous class or where they sought help.

Learning styles inventory. The third survey was a learning styles inventory (see Appendix N). The instrument included four individual measure of learning styles. The first was a measure of traditional learning styles or how a student would process various interactions through their senses taken from Lodge, Feehan and Martin (1999). The second was a measure of Kolb's (1976) theory of experiential learning which used Kolb's and Baker's (1979-80) *Personal Learning Guide.* The third was a measure of multiple

intelligences (Gardner, 1983, 1995) that used a survey developed by McKenzie (2003; 2005). These first three measures were ones that I had used in previous studies that had used this learning styles inventory (see Barbour & Cooze, 2004; Cooze & Barbour, 2005). However, in these previous studies feedback from the students indicated that they had difficulty with the terminology utilized in the Kolb and Baker (1979-80) and often required assistance from the researchers, the students' own teachers, or the students' own colleagues. The fourth measure was added to address this concern. Cox, Sproles and Sproles (1988) tested an adolescent-friendly instrument adapted from Kolb's (1976) Learning Style Inventory with over 2000 vocational students at 40 high schools. According to Sproles and Kendall (1986) the instrument was initially found to have been satisfactory for use with this population, and later to have been further validated (Cox et al., 1988), although there was no level of reliability provided in any of these three articles.

Online learning experiences survey. The fourth survey was an online learning experiences survey (see Appendix O). This survey was a modified version of an existing survey that had been used in higher education and corporate environments by a research group at the University of Georgia (see Jones, Koh, Hill, & Singleton, 2004; Singleton et al., 2004; Song, Singleton, Hill, & Koh, 2004). It was modified to be more applicable to virtual schooling. I used this modified instrument during a previous research study (Barbour, 2006a). The modifications that were made were due to the differences in the distance education technologies that were being used and the differences in the adolescent audience. For example, the potential responses for the question "Which of the following technologies did you use while of taking web-based courses?" would have

been changed to include all of the technologies that were available within the students' virtual school context. With only twelve participants, these surveys were not used for the purposes of statistical analysis, but they assisted me in providing a more complete profile of each individual student. The surveys were a secondary data source for each research question and assisted me in exploring why students' actions may have transpired as they did.

One of the limitations of the use of surveys was that it is a form of self-reported data. Each of the survey instruments relied upon the self-disclosure of the student in reporting whether or not they "find it easier to study for [their] exams at the last possible moment" or if they "pay attention to social issues and causes." One of the common concerns with these kind of self-report instruments was that "individuals tend to regard themselves as proficient, and honest/objective evaluation is difficult" (Barber, 1990, p. 226), which raised the potential for issues of reliability with these instruments. However, since these instruments were being used in conjunction with other data to construct a qualitative profile this concern was not as prominent as it might have been for a quantitative study.

Data Analysis

The data generated in this study was analyzed using an inductive analysis approach. According to LeCompte and Preissle (1993) this approach involves scanning the data for categories and relationships within individual transcripts and between transcripts. More specifically, I utilized the constant comparative method, a form of inductive analysis that shares its focus on identifying categories and on generating statements of relationships (LeCompte & Preissle, 1993). As Ezzy (2002) described, the

process of constant comparison is developing and identifying codes that can then be compared across the data.

I initially intended to use the qualitative analysis software package *ATLAS.ti*® to assist me in engaging in data analysis in a more systematic way. Unfortunately, I was not able to gain experience using *ATLAS.ti* prior to the data collection stage of this dissertation. At the advice of one of my co-chairs, I investigated the use of *Microsoft Word*® as a tool for qualitative data analysis (see Ruona, 2005). After a trial run using this method on an earlier data set (see Barbour, 2006b), I decided to utilize this method of analysis for my dissertation.

Ruona (2005) outlined a four stage process for using a table format and the search and replace features of *MS Word* to conduct a more systematic analysis of qualitative data. During stage one, I prepared the data by transcribing each interview and focus group verbatim, along with entering my observation field notes. Each interview, focus group, and field notes transcript was then formatted into a separate six column table and saved in individual files. Stage two called for a familiarization of the data which included "listening to the tapes (and watching video material), reading and rereading the data, jotting notes and memos about what I see and what I think is going on in the data" (p. 240). It was during this stage that I began to "tune into" many of the main themes in the data.

During stage three I coded the data. Codes were generated directly from the transcripts, survey, and documents collected. Emerson, Fretz and Shaw (1995) stated that coding allows for the identification and development of concepts and insights through close examination of and reflection on the data. As Charmaz (2000) suggested, these

codes facilitate the process of making comparisons in the data based upon a comparison of the data both from different people and from the same person at different points in time. For example, here are excerpts from interviews with JD when he was asked whether or not he used the asynchronous course content in WebCT.

> Interview 1 – "Yeah, sometimes if you … say you were doing a question and … you go back … to do your question and try to figure it out…"
>
> Interview 2 – "Nope."
>
> Interview 3 – "No, I never did that…. I've never checked it out"
>
> Interview 4 – "I haven't been into one of those this year."

In the first interview, JD indicated that this was one of the sources he used for content-based assistance. However, during the second interview he indicated that he hadn't used that source. During the third and fourth interviews, JD indicated that he had never used that source at all during the school year.

After each individual file had been coded, I began stage four or generating meaning. During this stage all of the individually coded files are merged into a single document, then organized based upon codes. Then I grouped the concepts that had been identified into categories (Strauss & Corbin, 1990). The process of grouping allowed for easier analysis because once a category was identified, I was able to start to develop the specific properties and dimensions. After this had been completed I considered potential category integration or splitting of categories, until left with a set of core categories (Pidgeon & Henwood, 2004). Finally, based upon these categories, themes were generated from the data and key quotes identified (for an example, see Appendix P).

Validity and Reliability

Regarding qualitative research studies, Merriam (1998) described validity as the extent that the researcher's findings represent the data accurately. There were a number of ways that I attempted to address the issue of validity in this study. First, I strived to provide rich descriptions of the unit of analysis. Firestone (1987) suggested that the research "provides the reader with a depiction in enough detail to show that the author's conclusion 'makes sense'" (p. 19). Second, I used member checking to increase the validity of the data (Stake, 1995). During the study participants provided feedback about interview transcriptions. Six of my participants took advantage of this opportunity. Third, I employed multiple methods of data collection to allow for a comparison of the data collected using the different methods (Bogdan & Biklen, 2003; Merriam, 1998; Patton, 1990; Yin, 2003).

Reliability in qualitative analysis is a more difficult concept to apply. Because the nature of human subjects and the inherent variability in their reactions and responses make a measure of whether or not a study will achieve similar results if it is repeated problematic, Lincoln and Guba (1985) suggested the terms "dependability" and "consistency" are more applicable. Using these terms as a framework, Merriam (1998) argued that reliability in case study research referred to whether or not other researchers would come to the same conclusions if they reanalyzed the same data. Yin (2003) also argued that in case study research, the goal was not solely the ability to replicate, but to "minimize errors and biases" (p. 34). He indicated that documenting the procedures followed in the case study was a useful strategy to allow others to be able to repeat those procedures in another setting. In an effort to address the issue of reliability, I kept a case

study journal which was used to describe the methodological decisions that I made throughout this dissertation study.

Another common measure of the quality of a research study is generalizability (Usher, 1996). Stake (2000) argued that the uniqueness of a single case makes it difficult to generalize the results to other cases. As mentioned earlier, Bassey (1999) believed that researchers were able to make fuzzy generalizations from case study research. "A fuzzy generalization carries an element of uncertainty. It reports that something has happened in one place and that it may also happen elsewhere. There is a possibility but no surety" (p. 52). However, others believed that generalizable theories can be generated from careful consideration of qualitative data (Bogdan & Biklen, 2003; Crotty, 1998). Yin (2003) for example, argued that findings from case studies may be "generalizable to theoretical propositions, but not to populations or universes" (p. 10). However, when faced with the dilemma of being able to generalize the findings to other settings, Merriam (1998) reminded us that a case study "is selected precisely *because* the researcher wishes to understand the particular in depth, not to find out what is generally true of the many" (emphasis in original, p. 208). In this specific situation, I hoped that some of the lessons learned in this particular case study would be useful in the operation of the CDLI at other schools in Newfoundland and Labrador, and even other virtual schools throughout North America, but fully realized that this particular school may be a unique instance.

Subjectivity Statement

My involvement in the CDLI, along with my own experiences as an online Advanced Placement teacher and course designer, and a researcher of web-based K-12 distance education and virtual schooling, provided me with a framework on how I saw

web-based distance education. In the five years that the CDLI has been in operation, I was involved with the organization on a continuous basis. During its first year of operation I was the Web-Based Initiatives Facilitator in the Vista School District for the CDLI. In this position I was responsible for the implementation and evaluation of the initial pilot course in the district, along with conducting research on a variety of topics from the role of the mediating teacher, the affects of student learning styles on their achievement, use of instant messaging as a means of online community building, and advantages of various school-based distance delivery set-ups. In its second year of operation I continued some of this research agenda (i.e., the affects of student learning styles on their achievement and the use of instant messaging as a means of online community building) with e-teachers and students from two different courses. During its third year of operation, I continued the research into the affects of student learning styles on their achievement with one e-teacher and his two courses, along with accepting the position of web-based developer for their World History 3201 course. This is a course that I re-developed during the first half of the CDLI's fifth year in operation.

In addition to this historic and current direct involvement with the CDLI, as a part of my doctoral studies I have been involved with the CDLI through research projects that explore web-based learning from the secondary student's perspective to inform strategies that can be implemented to assist web-based learning designers. In addition to my research involvement with the CDLI, I have also participated in research studies that have focused upon the Illinois Virtual High School and a variety of web-based delivery programs for Advanced Placement courses in Newfoundland and Labrador, and throughout North America.

Recently, Neumann (2006) explored the issue of passion in the scholarship of mid-career tenured faculty members. She described how the scholars in her study often publicly mask their passion for their research to present an unbiased accounting of their studies, however, these scholars felt comfortable in revealing this information in private to Neumann. Like the participants in Neumann's study, my own passion for students in rural schools and my belief in online forms of distance education, along with the research initiatives above influenced my thinking regarding web-based distance education for secondary students. That thinking has included the belief that if virtual schooling is well designed and well delivered, it can and should be accessible to all students. Given the information presented in Chapter One, along with statistics performance data from the CDLI (see Barbour & Mulcahy, 2006), I started this dissertation study with the belief that the CDLI was providing virtual schooling in a well designed and well delivered manner and I was interested in examining what that looked like from the students' perspective.

As a way to minimize the influence that this level of familiarity had on my analysis I spent a lot of time with the data. I was fortunate in a number of ways to be able to do this, as I finished collecting the data in June 2006, then I was awarded the School of Graduate Studies' Dissertation Completion Assistantship Award for the 2006-07 academic year. These events allowed me to spend over nine months analyzing the data with no other assistantship commitments. It also allowed me the opportunity to present initial themes at conferences, such as the annual convention of the Association for Educational Communications and Technology and the Virtual School Symposium, or during the research presentation portion of the three job interviews I attended. During this nine month period I was also able to examine the themes at bi-weekly meetings with one

or both of my co-chairs. The ability to publicly discuss these themes allowed my co-chairs or those in the audience during presentations to ask questions such as did you notice… or have you found… or, even, really how prevalent is…. Armed with these questions, I had the time to go back and re-analyze the data to ensure that themes I found emerging were supported by the data and to examine if other suggested or expected themes had been overlooked initially.

Along with my own involvement, both on a professional and scholarly level, I also had personal relationships with many of the administrators of the CDLI and the majority of its e-teachers and course developers, given my involvement with the organization over the past five years. This familiarity served to assist my dissertation study in opening doors of opportunity, but also meant that I had to be careful that it did not serve to influence me in unintended ways, something I was personally aware of throughout the process of data collection and analysis.

In addition to the familiarity and involvement with the CDLI, there is also the issue of familiarity with the research setting. Both my parents' families were from this portion of the province and many of my relatives continued to reside in these and neighboring communities. Members of my family have been or are well-known and active members in these communities. I had also been personally involved in the community where this school was located, having coached hockey teams that have played against teams from the local minor hockey association, having refereed three provincial tournaments hosted by the local association, and even having acted as a trainer for one of the local association's teams when it was participating in an invitation tournament hosted by my own minor hockey association. Also, in terms of the specific

school involved in this case study, the principal of this school is a second cousin of mine. I have another first cousin and aunt that also work at the school. The fact that members of my family and I were known within the community, and the fact that relatives of mine could be found on the staff of the school involved, could have also been a source of bias for both my research participants and myself. In the same way that I had to guard against bias from my prior involvement within the CDLI, this was also an issue that I had to watch closely.

In order to pay conscious attention to this issue of familiarity with the people involved I took several steps. Each step involved a series of methodological decisions, such as repeating the primary interview questions during each of the monthly interviews, attempting to triangulate student data with personal observations and teacher interviews, and not being physically present in the room during those observations. A second step that I took was to keep a log of all instant messaging interactions that I had with the students. My primary reason for using instant messaging with the students was to remind them of their interviews or journal entry deadlines. However, instant messaging can also be used as a social communication tool – which the students at Beaches used. Due to this reality, I decided not initiate social conversations with the students, but to respond if they were initiated by the students – which allowed me to both keep a measure of professional distance and still be friendly with my participants. For example, in this brief exchange with Constance I reminded her about reviewing her interview transcriptions, but then she asked me about the display picture that I have in my MSN account and I responded.

> MKB says: Hey you... Have you had a chance to read through the focus group and the first two interviews that I sent you?

Connie says: no, not yet. I'll get on that ....is monday ok?

MKB says: Sure... I'll also be sending out the third interviews sometime on Monday and the fourth (and final) ones the following Monday.

MKB says: Just read through, let me know if you want to make any changes to things you said. If not, just e-mail me back and say it's okay.

Connie says: ok then!

MKB says: Thanks...

Connie says: man is that Don in the pic with you???

Connie says: lol

MKB says: Yup... Cherry and Ron McLean...

Connie says: holy wicked!

Connie says: lol

MKB says: Trudeau Airport in Montreal... It was a Sunday morning and they had done a Toronto-Montreal game the night before...

Connie says: oh, that's so cool. lol

MKB says: Anyway, I've kept you long enough... I'll let you get back to whatever you were doing... Have a good day...

Connie says: lol. U too.... cya

By logging the instant messaging conversations I was able to examine if there was the potential for any influence due to these conversations. Finally, the fact that I was able to spend nine months analyzing the data – and all of the advantages described earlier with regards to presenting initial themes and regular meetings with my co-chairs – allowed me

to examine the data in multiple ways, discuss the themes that were being presented, and even be challenged when my focus seemed too narrow.

Chapter Summary

In this chapter, I described the methodological design for my dissertation study. The design was a qualitative case study (Stake, 1995), with the case in question being the twelve students at one rural school engaged in virtual school courses through the CDLI. Over a period of six months I interviewed the students, had them respond to written prompts and complete surveys, and observed them in their school while they engaged in their online learning. I also interviewed teachers and administrators, both in this particular school and with the CDLI. Finally, I observed asynchronous and synchronous classes in a variety of subject areas and one synchronous tutorial session. I analyzed this data using the constant comparative method (LeCompte & Preissle, 1993) and *MS Word* as a tool for data analysis (Ruona, 2005). Issues of validity and reliability were addressed using a variety of methodological strategies, such as triangulation and member checking.

Chapter 4: Portrait of Rural Virtual Schooling[13]

> The rustic majesty that is Newfoundland & Labrador can be summed up in two words: "people" and "place." Both are unforgettable. The inhabitants of this isolated locale are as real as it gets. They are unpretentious, thoughtful, and witty. They'll charm you with their accents and their generous spirit. Though their lifestyle is neither opulent nor lavish, they will never hesitate to help a person in need. It comes from living in a harsh environment where a helping hand can make the difference between survival and some other, ugly, alternative. (Chafe & Pendgracs, 2004, p. 1)

The above excerpt from *Frommer's Newfoundland and Labrador* travel book is one vision of Newfoundland and Labrador that is painted for those who are interested in traveling to Canada's most easterly province. Geographically speaking, Newfoundland and Labrador is composed of two distinct areas: the island of Newfoundland and the mainland portion of Labrador. The province has a total area of just over 400,000 km^2 – or slightly bigger than the State of California – with the Labrador portion of the province making up three quarters of that land mass. As of the 2001 census, the population of the province was 512,930, with only about 30,000 of those living in the larger Labrador region (Statistics Canada, 2003). The capital of the province is St. John's, located on the Avalon Peninsula (which is in the southeastern corner of the province). The population of

[13] Much of the content of this chapter has been published as: Barbour, M. K. (2007). Portrait of rural virtual schooling. *Canadian Journal of Educational Administration and Policy*, (59). Retrieved on February 11, 2007 from http://www.umanitoba.ca/publications/cjeap/articles/barbour.html

the greater St. John's area is approximately 125,000 people, with the population of the Avalon Peninsula comprising about 60% of the population. In addition to a small population that is spread out over a vast geography, Newfoundland also has a high number of communities compared to its Atlantic Canadian neighbors – three quarters of which have less than 1,000 people.

Newfoundland and Labrador's education system has seen dramatic changes over the past decade and a half: from the re-organization of the denominational education system to the introduction of distance education as an alternative to amalgamation in rural areas. Just over a decade ago, the province was the only one in Canada to have a constitutionally-protected system of denominational education, meaning there was no public school system in Newfoundland and Labrador, but four separate Christian systems. Public funds were transferred from the Government to the four denominational education councils, who then funded their own school system through one of the twenty-seven denominationally-based school districts in the province. However, after a constitutional amendment in 1995 and another in 1997, the province created a single secular public system with 10 school districts (which was further reduced to four three years ago). What this re-organization has meant is that many rural communities that may have had two or more small denominationally-based schools, maybe in the same community or within busing distance of each other, have had those schools amalgamated or closed in favor of larger regional rural schools. In fact, the number of schools in the province has decreased from 593 in 1986 to 432 in 1996 to 287 for the 2006-07 school year, approximately two thirds of which are located in rural areas (Government of Newfoundland, 1986, 1996; Government of Newfoundland and Labrador, 2006).

The Challenge of Rural Schooling

Based upon the urban dominance of society in North America, Cosby and McDermott (1978) argued that not only has there been a perception of "rural folk as minority" (p. 14), but that the rural population has begun to resemble a minority in terms of the "problems of opportunity, achievement, attainment, services, and stereotyping" (p. 14). In particular, the problem of opportunity has been well documented in the educational context. In April 1979, the Government of Newfoundland and Labrador's Task Force on Education released its final report entitled *Improving the Quality of Education: Challenge and Opportunity* (Crocker & Riggs, 1979). The report confirmed the reality of the inequity of educational opportunities within the province's school system. Specifically, the report stated that not all schools were able to offer the same variety of courses to their students and many were not able to offer programs in home economics, music, industrial arts, guidance, art, and even some sciences. The authors of the report concluded that there was "little doubt that increased school size [had] the effect of increasing the variety of program options available" and that there was also a "problem of the range of competence of staff in smaller schools" (Crocker & Riggs, 1979, p. 104). Smaller schools, the report concluded, did not have the size or the teacher expertise to provide equal opportunities to their students as schools in larger and more urban areas.

This report led personnel employed in government agencies and academic institutions to conduct a series of studies that investigated the challenge of small and rural schooling, in addition to a number of interventions initiated by individual school districts. The first of these studies was the Royal Commission on Employment and Unemployment. In its final report, *Education for Self-Reliance: A Report on Education*

and Training in Newfoundland, the author found "glaring differences in educational attainment between urban and rural areas… [and that] rural Newfoundlanders are less educated than their urban counterparts, and it appears that the gap is growing" (House, 1986, p. 52). A year later the Small Schools Study Project was given a mandate to study challenges facing small schools in the province and recommend ways to enhance the educational opportunities for rural school students. The project staff surveyed administrators, teachers, and students from the 160 smallest schools in the province, while also conducting a national literature review and inviting written submissions from provincial school board and other stakeholders. Similar to the findings of the Task Force on Education in 1979, Riggs (1987) concluded that the number and variety of courses offered in small schools were limited, and that rural schools had difficulty acquiring and retaining qualified teachers due to more attractive incentives to teach in larger centers. This reality meant that rural schools were typically staffed by inexperienced teachers who were generally required to teach a wider selection of courses. Rural teachers also were teaching more often outside of their subject area training than their counterparts in larger centers. To address these problems, Riggs recommended the creation of a distance education school.

Web-Based Distance Education in Newfoundland and Labrador

As described in Chapter One, the Telemedicine and Educational Technology Resources Agency (TETRA) distance education program was first introduced during the 1988-89 school year and quickly grew. Following on the initial success of this program, the provincial Government looked to expand it into a wider variety of curricular areas. For example, in 1990 the Government appointed the *Royal Commission of Inquiry into*

the Delivery of Programs and Services in Primary, Elementary, Secondary Education. While the main focus of its report was the denominational education system that existed in the province at the time, the Commission also recommended the creation of a School of Distance Education and Technology.

One of the earliest models for a school of distance education was the East-West Project in 1996 (see http://www.cdli.ca/eastwest/), which was a joint project by four provincial governments to produce a course based on information technology curriculum targeted to adult learners at the high school level. One of the main lessons learned was in terms of the design of web-based instruction. McGreal (1997) indicated that it was determined early in the project that standards would be necessary to ensure that each of the modules were consistent. He also stated that these standards were used in the creation of a course development template. Shortly after the East-West Project, individual school districts began to experiment with web-based methods of delivery for distance education.

One of the largest of these web-based initiatives began in 1999, when the Centre for TeleLearning and Rural Education at Memorial University initiated the Vista School District Digital Intranet (VDI). This project developed a district-wide intranet to offer university-level (i.e., Advanced Placement) mathematics and science courses for online delivery to the eight rural schools with secondary grades within the Vista School District. According to Stevens (2002), students were taught "in real (synchronous) time using audio, video, and electronic whiteboards over the Internet, combined with… independent (asynchronous) learning, senior students were able to both interact with one another on-line as well as work off-line in their own community schools" (Teaching and Learning in a School-District Digital Intranet, ¶ 2). There were many lessons that were taken from the

VDI project. The refinement of the standards and course development template from the East-West Project for an adolescent audience, along with ideas on how a combined asynchronous and synchronous delivery model could be implemented, were among the forefront. In addition, many of the individuals who were involved in these same projects would become key players in the province's first web-based distance education initiative.

The Centre for Distance Learning and Innovation

In 1999, the Government appointed a ministerial panel to, among other things, "examine the current educational delivery model and consider alternative approaches" (Sparkes & Williams, 2000, p. 2). In their report, the ministerial panel recommended the creation of the Centre for Distance Learning and Innovation (CDLI) to be based upon the web-based model that had been evolving throughout the province. This model was not to be "totally dependent on high bandwidth technologies [and have a] minimal reliance on synchronous communications, fixed schedules or other constraining elements" (Sparkes & Williams, 2000, p. 65). The vision of the CDLI was to provide access to educational opportunities for students, teachers and other adult learners in both rural and urban communities in a manner that renders distance transparent; eliminates geographical and demographic barriers as obstacles to broad, quality educational programs and services; and develops a culture of e-learning in our schools which is considered to be an integral part of school life for all teachers and students.

Basing their opinions on the Barker, Wendel and Richmond's (1999) definition of virtual schools, both Nippard (2005) and Murphy, Rodriquez and Ciszewska-Carr (2006) agree that the CDLI is not a virtual school because none of its students are full time virtual learners. Both also acknowledge that the CDLI is an example of virtual schooling.

Based on the more common Clark (2000) definition, the CDLI does constitute a virtual school because it is a state approved school that offers secondary credit courses through web-based delivery methods.

The CDLI began in 2001-02 with 10 courses field tested in 10 districts (i.e., one course per district), having a total of 200 student enrollments from 76 different rural schools. After the field test, the CDLI expanded its course offerings so that students from all over the province could access any course. Over the past four years, the CDLI has increased its offerings to the point where there are 1,500 student enrollments from 95 different schools in 35 courses in 2004-05 (Government of Newfoundland and Labrador, 2004).

The CDLI provides a variety of instructional support for students enrolled in any of their 35 courses. The two main sources of this support come from synchronous and asynchronous instruction. The CDLI has experienced and highly qualified teachers that provide, depending on the subject area, anywhere from 30% to 80% of the students' scheduled time (which is 10-one hour periods over a fourteen day cycle) in synchronous instruction using the voice over Internet protocol software, *Elluminate Live*® (Elluminate Inc, 2006). This software allows for two-way voice over the Internet, a shared, interactive whiteboard, instant messaging, application sharing, breakout rooms, and interactive quiz and survey management. Through this software, teachers are able to provide synchronous instruction in much the same way that they would in a traditional classroom.

The asynchronous instruction is conducted using a course management system called *WebCT*®. This software provides the teacher and students with a variety of tools, including: a discussion forum, a shared calendar, an internal e-mail system, and a place to

house the course web pages. The course web pages are designed by a team of two individuals: a teacher acting as a subject matter expert and a multimedia specialist to add images and interactive items into the content. The course web pages are divided up into the units called for in the provincially mandated curriculum guide, further divided into sections which are akin to themes that may flow in each of the units, and finally into lessons which are designed as the items of actual asynchronous instruction that can be completed in usually one to three hours of student time. Each lesson is broken down into five component parts (see Figure 4.1).

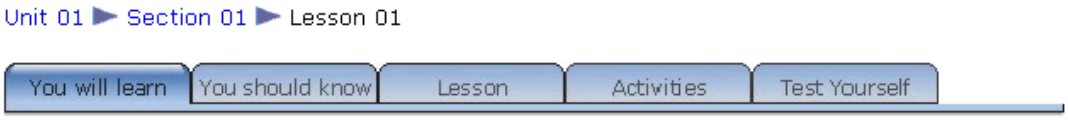

Figure 4.1. Overview of the Lesson template

The five component parts of the template above include:

1. You Will Learn – briefly lists, in student friendly language, the instructional outcomes for the lesson;
2. You Should Know – lists, and when necessary elaborates on, knowledge and skills students are expected to have mastered prior to the lesson;
3. Lesson – is self-explanatory and may be broken into multiple pages;
4. Activities – contains further instructional events the student that students need to carry out in order to master the lesson outcomes; and
5. Test Yourself – offers an opportunity for the student to gauge the degree to which the outcomes were achieved. (Centre for Distance Learning and Innovation, 2003, p. 12)

In addition to the course web pages, teachers regularly utilize the course calendar to post upcoming work and assignments, deadlines, and a notification for quizzes and tests. Teachers also regularly use the internal e-mail system and discussion forums to communicate with their students outside of their synchronous class time (known as online time, as opposed to the non-synchronous or asynchronous sessions which are known as offline time).

The CDLI participates in the Tutoring for Tuition program – a program that provides tuition waivers for students attending or planning to attend public post-secondary institutions in the province who are hired as tutors at schools throughout Newfoundland and Labrador. Through their participation, the CDLI provided senior secondary and post-secondary students in 21 different subject areas that are available for synchronous tutoring using the *Elluminate Live* software for two hours each day outside of the traditional school day (i.e., after 3:00 p.m. on weekdays) to students who are enrolled in CDLI courses. The CDLI has also developed a series of 50-100 multimedia learning clips per course, for eleven courses that are evaluated with year-end standardized public examinations (see Figure 4.2).

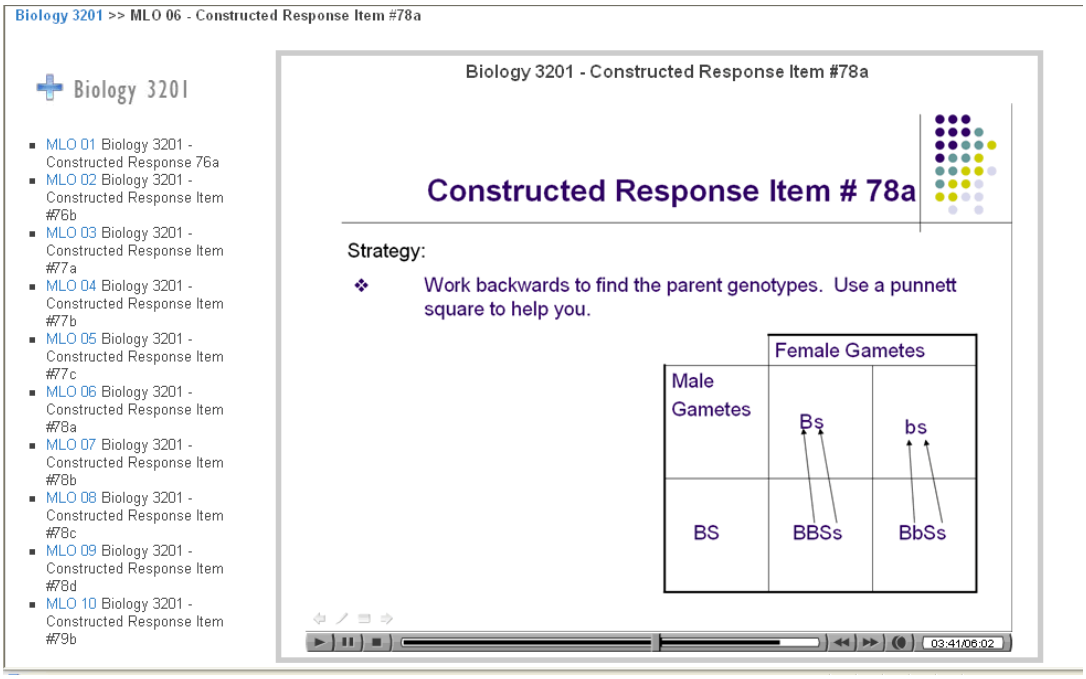

Figure 4.2. Public examination multimedia learning object

These learning clips were developed by practicing classroom teachers and have been designed to provide a thorough review to complement in-class preparations for the public exams. Finally, the CDLI has created additional learning clips for four public exam courses based upon the June 2004 public exam and for five public exam courses based upon the June 2005 public exam, along with resource course webs for two additional grade 10 courses.

At the school level, each school had one teacher that is assigned with responsibility of maintaining the computers in the school, including up to six CDLI computers, and all of the necessary software and hardware for the students to be able to access the aspects of their web-based courses. The CDLI also arranged for all schools that have students in courses offered by the CDLI to have ADSL, cable modem, frame relay, or high speed satellite (two-way) connections to ensure adequate bandwidth. In addition to the school-based teacher responsible for technology in each school, schools

are also responsible for having a mediating teacher (known as the m-teacher) or mediating team (known as the m-team). The goal of this m-teacher or m-team is to provide supervision and support (although not academic support) to the students enrolled in CDLI courses. These are the teachers who proctor tests and exams, monitor student attendance and behavior, and provide general support in gaining the independent learning and self-motivation skills that may be needed to succeed in the CDLI environment.

To date, there has been little research conducted on how these mediating responsibilities are actually being implemented at the school level. Mulcahy (2002) was concerned that with less student selectivity, an increasing need for distance education by rural schools, and the nature of the proposed delivery, teachers who were given mediating responsibilities for the CDLI would play a critical role in the success of this new initiative, and that there was a failure to consider the additional workload that would be placed on these rural teachers. This concern was well founded, at least during the initial field test of the CDLI. During that first year, Barbour and Mulcahy (2004) found that teachers in one district reported that "quite a burden [was] placed upon them due to the wide range of duties and time commitment associated with these new responsibilities" (Conclusion section, ¶ 2). They also found that these teachers reported to providing technical and instruction assistance, both of which were outside of the original vision of the ministerial panel. Unfortunately, there has been no further research exploring how these additional responsibilities are managed at the school level since that first year of operation.

At Beaches All Grade, these responsibilities fell upon the m-team – a group of individuals who included the school's principal, technology teacher, secretary, custodian,

and a student enrolled in the CDLI (who holds the title of e-tutor). The e-tutor assisted the administrator, who manages the school's CDLI program. The e-tutor also assisted the technology teacher who maintained the CDLI technology. The administrator was the person primarily responsible for the supervision of the CDLI students. However, supervision was usually limited to random visits to the distance education room to simply "check in" on the students. The exception to this is when the students were required to complete tests and examinations. The more formal supervision, or proctoring of these assessments, was typically completed by the administrator, although given that the administrator also had half time teaching responsibilities, any teacher who had a preparation or non-contact period when the assessment was being conducted could have been drafted into supervising. If there was no teacher available, the school's part-time secretary may have been called upon to fulfill this responsibility. However, as the secretary was only at the school for the first half of the school day, sometimes the CDLI students had to complete their assessment in the same classroom as the administrator while he was teaching own of his own courses to a separate group of students. For example, during the data collection process, I volunteered on two separate occasions to supervise assessments because no other teacher was available at the time.

Beaches All Grade

Introduced in Chapter Three, Beaches All Grade is located in the town of Beaches – a community in Blue Ridge Bay. The communities of Blue Ridge Bay are serviced by the Nova Central School District or District 3 (see Figure 4.3).

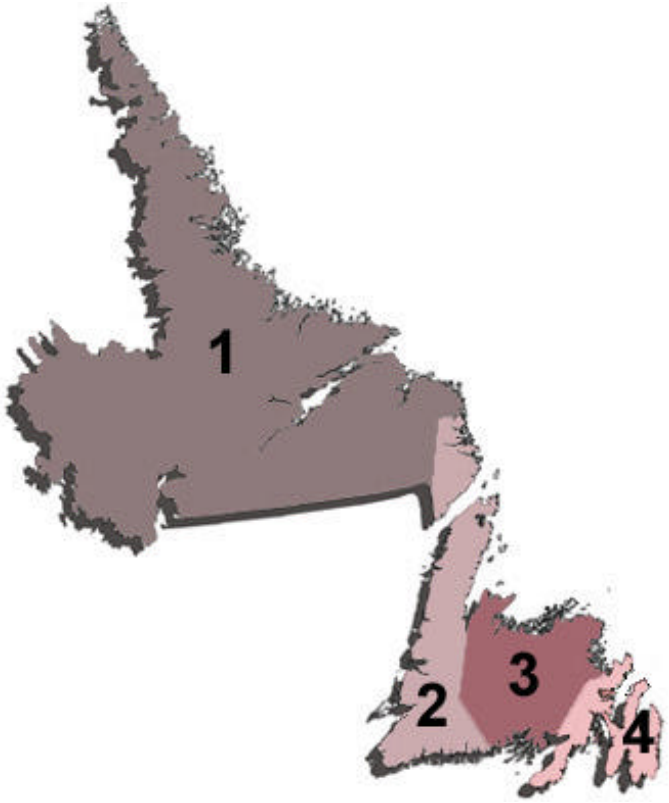

Figure 4.3. Map of Newfoundland and Labrador with school district boundaries (Government of Newfoundland and Labrador, 2005)

This district is the most rural on the island portion of the province with 75 schools in 54 communities, some of which are only reachable by ferry service from the mainland of the island. It is geographically responsible for the central Newfoundland region and the south coast of the province. The Blue Ridge Bay area is similar to many other coastal regions of the province. Almost all of residents are of Anglo-Saxon descent, particularly focused upon the Wessex counties of southwestern England. The fishery, which brought their ancestors to the province originally, is the primary source of employment and, in the same way merchants were the gentry of the nineteenth century, fish plant managers and boat owners are the leaders of industry in the many small communities that litter the coast line. In some of these communities are regional schools servicing geographic areas that

can span up to 100 miles in for high schools and between 40-65 miles for elementary schools.

Beaches All Grade had a student body of 108 students and a teaching staff of 15 during the 2004-05 school year. This was an average of approximately 14 students per grade. Because of this small enrollment, students at Beaches All Grade have accessed web-based courses each year the CDLI has been in operation. During the initial implementation year, Beaches had four students enrolled in the course that their district was responsible for pilot testing (there were also 17 enrollments in five other courses offered through the former TETRA system that year). The following year there were 16 enrollments in four CDLI courses, which increased to 22 enrollments in seven courses the next year. The fourth year Beaches had 32 enrollments in eight courses. This past year there were 21 enrollments in eight courses, which were filled by 12 different students. Three of these students were taking their first web-based course at the time of my study. However, due to this out-migration, the continued shrinking school population, and even with the use of the CDLI, the current five year plan put into place by the school district calls for students attending the high school portion of the school (i.e., grades 10 to 12) to be bussed to a neighboring school – John McDonald High in Easton (located 25 miles south of Beaches).

From their perspective, when asked to describe their school the students who participated in this dissertation study all began by telling me that their school was "small" or "really small." They also overwhelming indicated that the people there were "friendly" or "close knit," not only students but teachers as well, for example:

> "…you meet a lot of good friends, everybody's friendly, both the students and the teachers, they're there to help you out whichever way you need help, help shape you into the person that you, that I've became so far since I've been in high school, a lot of people you can just get along with." (Dayna)
>
> "…the students and teachers are all great, the students are well behaved and everything." (Kathy)

A Personal Visit to Beaches All Grade

On entering the secondary portion of the building, visitors enter into a split-level porch-like area with a big mural on the way that acts as a directory with the location of various facilities in the school, such as the main office, the computer lab, and the gymnasium. The main office is upstairs. I arrived at the school before the busses and about a half hour before the school day began. The main hallway of the second level looked more like one would expect to see it during the summer holidays – it was clean, free of any indication that students had been present four days ago or that they would be arriving in less than a half hour. I walked into the main office where I was greeted by the principal, who spent the next 10 minutes introducing me to the other teachers and staff as they arrived at the school. The main office began with a secretarial area, the principal's office to the right-hand side and to the left-hand side was a small kitchen which led into the intermediate and secondary teachers' staff area. Later in the day I was speaking with the custodian, who doubles as one of the two bus drivers, and he told me that the staff at the school was quite close as colleagues and friends – to the point that he used the term "family" to characterize the group.

Upon touring the secondary portion of the school, I began with the second floor, where the main office was located, along with the CDLI room and a separate computer lab. The CDLI room was located on the same side of the hallway as the main office, with its entrance about 20 feet away. The computer lab has a classroom connected to it that was used as a room for the student to do fabrication activities. Near the door of this computer lab, sat the school's network server. It was placed with all of the other computers available for student use. The only thing that made it stand out from the others was a sign constructed with a pen and a sheet of loose leaf paper that read "Server – Do Not Touch!" (see Figure 4.4).

Figure 4.4. Photograph of the server at Beaches All Grade

Later in the day I again met with the principal, as he went through the list of the 12 distance education students, providing me with the names of both parents/guardian's of

all of the students from memory (usually with additional information about the family) and then looking up their telephone numbers for each of these students. The smallness of the school was further impressed upon me by a sheet pinned to the bulletin board in the secretary's portion of the main office, a telephone tree sheet in case of school closure – which at face value is not surprising, as my own school with a staff of over 30 had one of these – the striking aspect of it was the fact that it wasn't for teachers to call other teachers to let them know of school closings, but for teachers to call roughly 8-10 sets of parents. It was a telephone tree to inform not only the staff, but all of the students as well.

The distance education room is a fairly large room, but also has a fairly large room inside of it – kind of like a storage closet – which cuts the room almost in half and decreases its space dramatically (see Figure 4.5 for a diagram of this space).

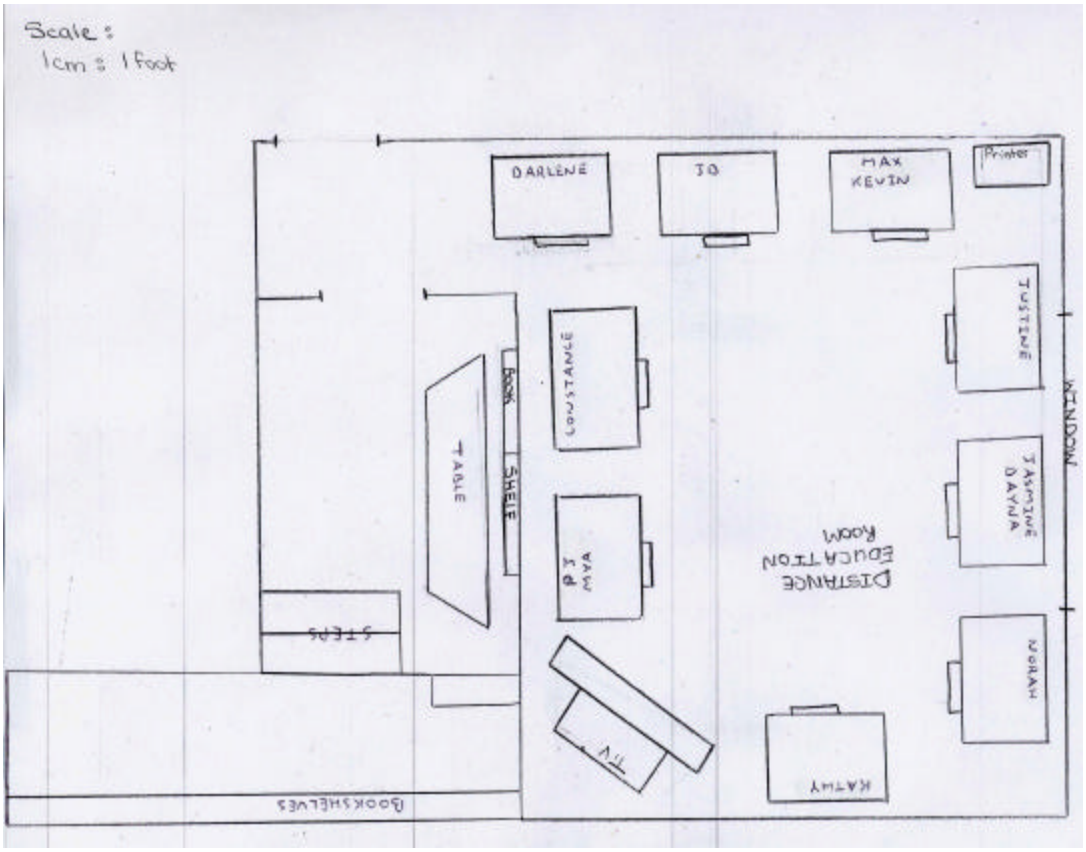

Figure 4.5. Scale diagram of the distance education room at Beaches All Grade (drawn by Justine)

As you walk into the distance education room, to the left is the main area with computers and other equipment and directly ahead is the entrance to this storage area. In the storage area, there are videos, books, numerous copies of old textbooks, distance education handbooks from the former TETRA courses, maps and posters, and a variety of other instructional materials. Upon asking one of the students before the first period, I was told that the space was designed to be available to the distance education students as a set of resources that they could use to support their learning, and while this could have probably been the case, it reminded me more of a curriculum storage area for teachers and their resources – which may have been or may still be its dual purpose. In any regard, there were lots of resources and materials available to the students for not just their distance education courses, but for pretty much all of the intermediate and secondary curriculum offerings.

The main portion of the distance education room contains nine computer workstations – all of which have been provided by the CDLI, along with an all-in-one printer/fax/photocopier/scanner and a large television with what appears to be video-conferencing equipment on top. Each of the workstations appeared to be personalized, with a blue label that has a student's name written on it. It appeared that most students have their own machine, while three machines are shared by two students each. The students appear to have personalized their workspace, with books and hand-written notes specific to their courses on the top or inside of the desks – with one girl even having a picture taped to the side of her monitor and another girl having a shirtless male actor as the background on her desktop. Next to the door are little hooks for all of their personal headsets for the synchronous classes, probably so that students don't have to share,

granted most of the headsets are simply laid next to the individual workstations (probably due to the fact that the workstations appear to be specific to individual students). Along the wall in the corner with the video-conferencing equipment, are two bookshelves with VHS tapes, a number of French-English dictionaries, regular dictionaries, a thesaurus, and binders. On the other wall in this corner is a whiteboard, which is located behind two of the workstations, in addition to the video-conferencing equipment.

Students at Beaches All Grade

Over the past five years the number of distance education students at Beaches All Grade has varied from five or six to a dozen or more. During the 2005-06 school year, there were 12 students: one grade 10 student, five grade 11 students, and six grade 12 students. This section provides details of the study's primary eight participants. Given that some of the four who were excluded from the analysis of the interview data are discussed in Chapter Five in relation to their interactions with the eight students who were the focus of the analysis, I have included descriptions of these four students in Appendix Q. Based on observations and interactions with the participants, individual profiles were created for each. A copy of each description was sent to the individual student for feedback. With the exception of one minor change which I made in one student's profile, none of the other students indicated they desired modifications to these descriptions.

Overall, these students were a diverse group of individuals – ranging from those who were university or college bound to others who were heading into a trade or directly into the work force. While the students had more than adequate levels of Internet and technology access in school, they had varying levels of access to computers and the

Internet at home – and due to the circumstances of this rural location, for the most part they did not have access to the types of technology or the necessary bandwidth to allow them to exhibit any of the characteristics of digital natives. The exceptions to this are noted in the individual descriptions below.

Jasmine. Jasmine was the only grade 10 student enrolled in a CDLI course at Beaches All Grade this past year. This was somewhat uncommon, as Beaches typically had two to four grade 10 students registered in a second language course. Enrolled in a fine arts course, Jasmine was scheduled to take her CDLI course at the same time as three grade 11 students and one grade 12 student who were taking a science course. A shy, quiet, and unassuming girl, her silence was even more apparent given that she was the only grade 10 student in the room and the only student enrolled in this fine arts class at Beaches.

Jasmine was the younger sister of the school's valedictorian. She was also a strong academic student in her own right. The principal at Beaches spoke highly of her academic ability and one wondered why she had elected to enroll in a fine arts course (usually taken by students who do not perform as well in measures of K-12 achievement), as opposed to a second language course (which was usually reserved for the students who perform better academically).

Jasmine had access to a home computer and an Internet connection, which she shared with her older sister (and her parents were frequent users as well). While it was unclear if she had ever tried, Jasmine reported that she did not use her home computer to do work for her CDLI courses.

Justine. For the past two years, Justine, a grade 11 student, has been the school's curriculum e-tutor for the CDLI. This meant that she was selected by the principal and technology teacher to be responsible for many of the minor issues that arose with the CDLI, such as making sure the printer had paper it in, scanning student tests and assignments so the principal could e-mail them to the e-teacher, or, in Justine's own words, "I fix the printer and stuff… when the paper jams or something like that…" These duties seemed to include assisting with this study, as she was my point of contact when I needed information.

Justine had taken only one online course the previous year, but was enrolled in three courses through the CDLI this year: a language arts course, a mathematics course, and a science course. During her time in the distance education room, it was not uncommon for Justine to be caught singing some song that she had in her head at the time. An outgoing girl, she always seemed to be cheerful and willing to chat with students and teachers alike. Justine was actually born in the capital city, but had moved to Beaches before she was school-aged. This meant that like 11 of the 12 CDLI students, she had spent her entire schooling career at Beaches All Grade.

There was a home computer and Internet connection in Justine's home that she shared with a brother and her parents. During one interview, she indicated that her parents were the primary users of the computer and that 90% of the time she spent on it was for school work. She did not elaborate whether it was for CDLI courses or her classroom-based courses, or whether or not she could access *WebCT* or *Elluminate Live* from home.

Constance. Constance, or Connie as she was called by some, was a short, mature looking girl. A grade 11 student, Constance lived with her father in Beaches. During this past school year she was enrolled in a language arts course, having taken the first course in that sequence a year earlier when she was in grade ten.

Self described as being an outgoing individual, Constance was the student most likely to laugh at something that someone else had said – even if nobody else thought it was funny. She was also likely to talk non-stop during her CDLI classes. It didn't seem to matter if it was an asynchronous or synchronous period, Constance would be the one to ensure that the conversation (both about their course and about everything else under the sun) continued for the full 60 minutes.

Constance was the primary user of the computer and Internet connection in her household. She also reported that although she was able to access both *WebCT* and *Elluminate Live* from home, she would "prefer to… use Internet access at school because my computer is slow."

Jason. Jason, or JD as he was more commonly called by his friends and teachers, was your typical male teenage high school student. A grade 11 student, he appeared to have the potential to perform very well in school, but was easily distracted by those around him (as evidenced by the numerous conversations that he would have with Kevin during both his asynchronous and synchronous classes). It also appeared that JD had made things other than school higher on his list of priorities, given that he finished the year with a mid-70 average, for which he was personally pleased.

During this past school year, JD was enrolled in two courses through the CDLI: a mathematics course and a language arts course. He had also taken another language arts

course the previous year as a grade 10 student. During his language arts course, it was common for JD to be relatively quiet, speaking with the two other students in the room only when they engaged him. This was contrasted with his mathematics class when he would either be working diligently (as he did during his language arts course) or chatting with Kevin.

He was the primary user of the computer and Internet connection in his home, reporting that he did not have to share the computer with anyone. During one of his interviews he indicated that he had no problems accessing any of the aspects of *WebCT* from his home computer, but had never tried to access *Elluminate Live.*

Peter. Typically dressed in a baggy T-shirt or sweatshirt, Peter was the lone hockey player among the group of CDLI students. Peter, or PJ as he was commonly called, was also a grade 11 student enrolled in two CDLI courses: a mathematics course and a science course. His work ethic in his CDLI courses fluctuated. During synchronous classes, he would be one of the most active students, typing frequent questions, comments, and response to questions in the direct messaging feature of *Elluminate Live,* particularly in his science course. However, in the asynchronous classes he was just as likely to sit and chat as he was to do his work. When he decided to work, he was quite focused with his fellow students' often having to speak to him twice to catch his attention.

Unlike JD, Peter is much more outgoing – at least within the school environment, talking with almost everyone and anyone in the corridors before and after school. Regardless if it was one of his peers, a student in the younger grades, or a teacher, his voice and pronounced Newfoundland accent were unmistakable at any distance.

Described by a fellow student as being "very funny," PJ was the type of student that would walk around with candy in his pocket for himself and to share with friends or who would wear a pair of those sneakers with the wheels in them that you often see little children wearing, as they roll down the sidewalk – much like PJ would roll down the corridor just to get a laugh.

PJ had access to a home computer with Internet access. While he cited the lack of speed of his dial-up connection, he said that he was able to access both *WebCT* and *Elluminate Live* when it was needed.

Mya. This year was the first year that Mya had ever taken a CDLI course, enrolling in a language arts course. She also had an open slot (i.e., free period) in her timetable that she primarily spent in the distance education room. An outsider who quickly became an intrinsic part of the Beaches community, Mya was born in Ontario and was the only member of the graduating class not originally from the area. She was also the only CDLI student who hadn't spent their entire schooling career at Beaches All Grade. Even to listen to her accent, it would never have been obvious to the outside observer if she did not tell you she was not a local. She was the student council president and active member of the graduation committee.

Mya probably exhibited many of the characteristics of a digital native when she lived in Ontario. In describing herself, she indicated that while living in Ontario she had a cell phone that she regularly used both for calls and text messaging. Even during this study she report that she still kept in touch with her friends back in Ontario through instant messaging. However, since moving to Clarke's Bay she had given up her cell phone and the amount of time that she spent on the computer and the Internet had

decreased. She was not unlike most of her peers, with the potential to be a digital native if there were greater access to the technology in the area.

There was a separate computer room in Mya's house where she was able to access the family computer and all necessary components in *WebCT* and *Elluminate Live.*

Kathy. Jasmine's older sister, Kathy, was a grade 12 student enrolled in three CDLI courses: a semesterized[14] mathematics course, a language arts course, and a science course where she was the only student in her school. Due to the semesterized course, during the second term, Kathy also had an open slot in her timetable, and she was typically in the distance education room during this time. Prior to this year, Kathy had taken two CDLI course as a grade 10 student (two language arts courses), but none during her grade 11 year.

A slight and quiet girl who was active in cadets[15] and was the graduating class valedictorian, Kathy was the model of what a distance education student should be. As the only graduating CDLI student with plans to attend university, even Kathy seemed to realize her independent work ethic, given that in the "I Hereby Leave…" section of the graduation book she wrote, "My self discipline for those who can't buckle down and do their work." Kathy was serious in her studies, even during her science course and her free period the business-like attitude towards her work made her consistent with the student that Stevens described as an example of an effective online learner.

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[14] Within the Newfoundland and Labrador school system, the word semesterized refers to courses that are a semester long – with the school year consisting of two semesters.

[15] The cadets program is intended for youth between the ages of twelve and eighteen that is sponsored by the federal Department of National Defence. The program is designed to teach skills like teamwork, leadership, and citizenship through age-appropriate training based upon the various branches of the Canadian Forces. It is similar to the Reserve Officers' Training Corps that can be found on many American campuses, but targeted to a middle or second school student and without the commitment or exception of service after completion.

Kathy had access to the same home computer and Internet connection as Jasmine and according to her sister, Kathy was the more frequent user. Kathy had indicated that she had tried to use both *WebCT* and *Elluminate Live* from home, but usually didn't work from home because the computer was too slow.

Max. Max was a tall, eye-catching young man who was an accomplished athlete within the school. His athletic success was recognized by most, and he even referenced this in the "I Hereby Leave…" section of the graduation book which read, "My athletic skills for all those who want to succeed in every sport." A grade 12 student, Max was enrolled in three CDLI courses: a semesterized mathematics course and year-long language arts and science courses. Like Kathy, Max also had an open slot in his schedule during the second term due to the semesterized mathematics course, which he would typically spend in the distance education room as well. He had also completed another language arts course through the CDLI as a grade 10 student.

Also like Kathy, Max was very responsible when it came to his school work – regularly working on one of his CDLI courses during his free period. While not possessing the same business-like approach to his work, he was conscientious enough to be only one of two grade 12 students who did not skip off from school when all of the grade 10 and 11 students from Beaches were away for three days on a field trip.

Max did not have access to a home computer and he would "usually writes everything up at home and goes to school a little bit early and types it all up before class."

Chapter Summary

In this chapter, I described the context of Newfoundland and Labrador, specifically focusing upon the rural nature of the province. I also examined some of the unique challenges than have been identified by the Government of Newfoundland and Labrador related to the issue of rural schooling. I then discussed the evolution of distance education in the province, as a means to address some of the identified challenges, and how these individual school and district-based programs led to the creation of a provincial virtual school – the CDLI. Next I examined the design and delivery of the various programs and services offered by the CDLI and how those programs and services were administered.

I also described the rural school that was the focus of this case study, Beaches All Grade, including the implementation of the virtual school program within this one rural school. Finally, I depicted the eight students who were the focus of this case study by profiling each student individually.

Chapter 5: Results and Discussion

The purpose of this study was to examine the nature of web-based learning in Newfoundland and Labrador secondary education. Specifically, this study examined how students interacted with their web-based courses and the process they undertook when they needed help. This study was guided by the following questions:

1. What were the students' experiences during their synchronous time online?
2. What were the students' experiences during their asynchronous time online?
3. When students required content-based assistance, where do they seek that assistance and why do they choose those sources?

In this chapter, I present and discuss the findings for each question.

As it was discussed in Chapter Three, the results have been based upon an analysis of primarily eight students: Jasmine, Constance, Justine, JD, PJ, Mya, Kathy, and Max. However, the raw data (i.e., quotations) that are presented in this chapter will rely more heavily upon only five of these individuals: Constance, Justine, PJ, Mya, and Kathy. Unfortunately, the only grade ten student (Jasmine) and two of the three males (JD and Max) were not as forthcoming with information as the others. A good illustration of this comes from a part of conversation, in which Constance, Justine, and JD participated. During the forty minute session, JD did not speak via the microphone and only interjected short written comments through direct messaging, compared to Constance and Justine who actively made verbal and written comments – as shown by the two sections of transcript in Table 5.1.

Table 5.1. Transcript from the focus group conducted on Tuesday, February 21, 2006

C = Constance J = Justine JD = JD I = Interviewer <text> = direct message comment	J: Ahh, its really good and it's more, I find it more enjoyable than the courses that we do with teachers downstairs that we can see, but umm, overall, I like 'em a lot better, I wish all, most of my courses was online. I: Constance or JD, do you guys have any thoughts on that? C: Pretty much what Justine said, and also I find on CDLI <JD: nope she summed it up pretty good> there's more, you get more of an option, like in the class you're basically graded on your tests, but in CDLI you got a lot of assignments and little projects and things that build up your marks.
	J: Ahh, personally I don't, I don't know about others, but I don't use that time to do other courses, just CDLI courses. C: I find <JD: same here>, we only have three offline in a fourteen day cycle and usually our teacher, and I'm only in French, <J: i don't know bout u guys??> our French teacher takes that for online as well for extra help, and then or offline courses, or classes that we do have we usually need them to do French work, but if not, you know, we use it for something else.

Where possible, I have tried to include quotations from Jasmine, JD, and Max; however, in many instances I use a quotation from one of the more expressive five and indicate the others who agreed with the sentiment.

Research Question One: What were the students' experiences during their synchronous time online?

As was discussed in Chapter Two, the use of regular synchronous instruction is typically associated with virtual schools in Canada and was one of the main differences between the Centre for Distance Learning and Innovation (CDLI) and most of its American counterparts. In the same way if you were to observe ten classroom teachers teach a single lesson, or a single teacher teach ten lessons you would see a wide variety of instructional approaches. This variety of instructional practices of e-teachers during their

synchronous lessons was apparent during the study. In addition to the variety of instructional practices that were present during the students' synchronous time, this synchronous component was also where most of the instruction actually occurred, as most of the asynchronous "instruction" was similar to the more independent environment described by Greenway and Vanourek (2006) in Chapter Two.

Many e-teachers used the virtual classroom in much the same way that they would use a traditional classroom. For example, it was common for teachers to use the electronic whiteboard in a manner similar to how they would use a traditional whiteboard as a space to diagram new concepts as they were introduced to students (see Figure 5.1).

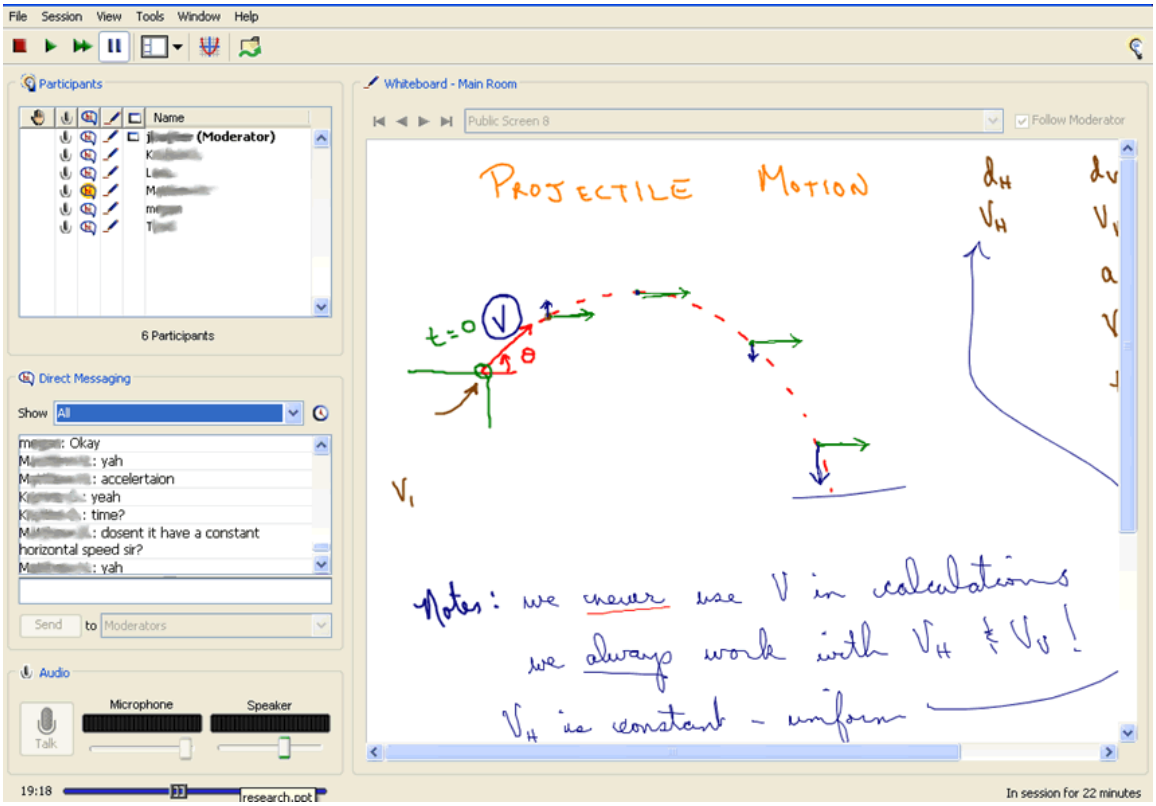

Figure 5.1. Example of a teacher introducing a new concept on the electronic whiteboard

In this example, notice that the students used the direct messaging area to ask the e-teacher questions and he addressed these questions as he introduced the concept. Unlike some virtual classrooms, the synchronous tool utilized by the CDLI only allowed for one

individual to control the microphone at any given time. Because of this, e-teachers encouraged students to use direct messaging as it allowed students to interact with the e-teacher without the e-teacher having to release the microphone. It also allowed the e-teacher to address the students' questions while simultaneously conversing with the class.

It was also common for e-teachers, particularly in the mathematics and sciences, to use the whiteboard as a space to work out sample problems for the teachers (see Figure 5.2).

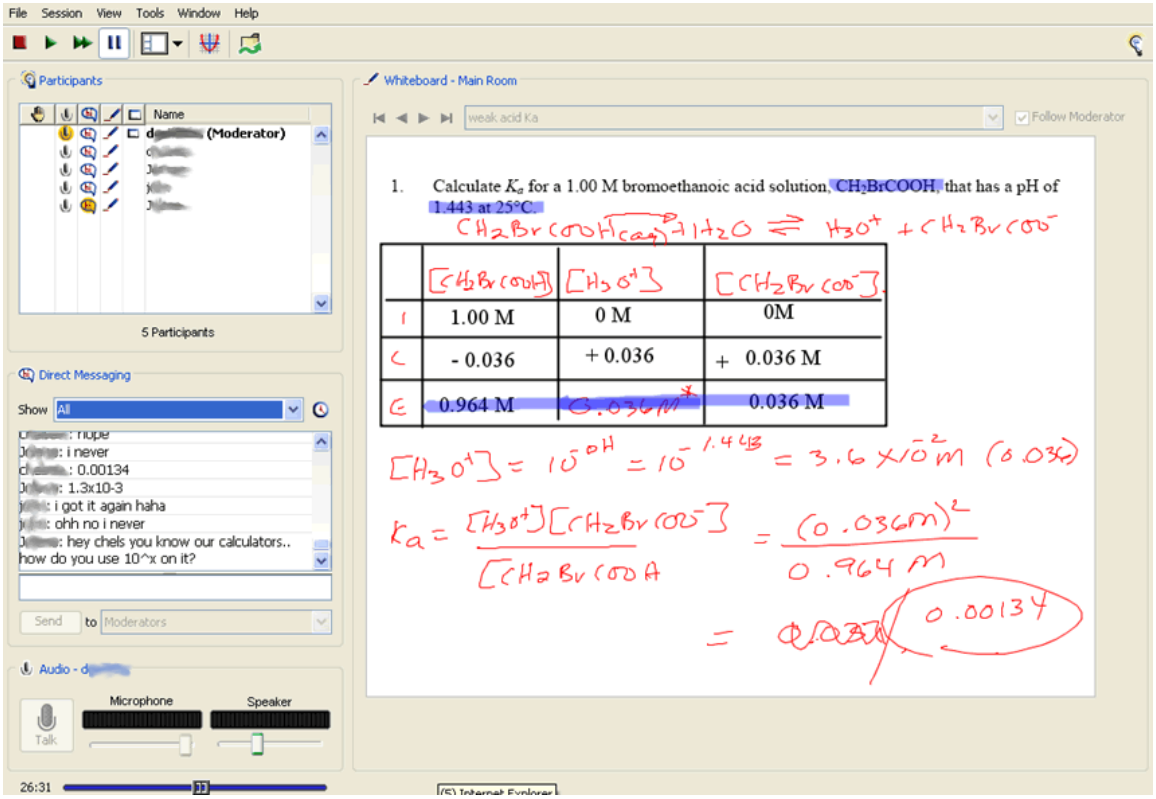

Figure 5.2. Example of a teacher working out sample problems

Notice that in this example, the e-teacher asked the students to complete the calculations on their own and post them in the direct messaging area, prior to her writing the correct answer on the whiteboard. This was another way in which e-teachers encouraged interaction through the use of direct messaging.

Still other e-teachers used it as a tool to deliver lectures, using the whiteboard as a space to present notes and images – usually created using *MS PowerPoint* (see Figure 5.3).

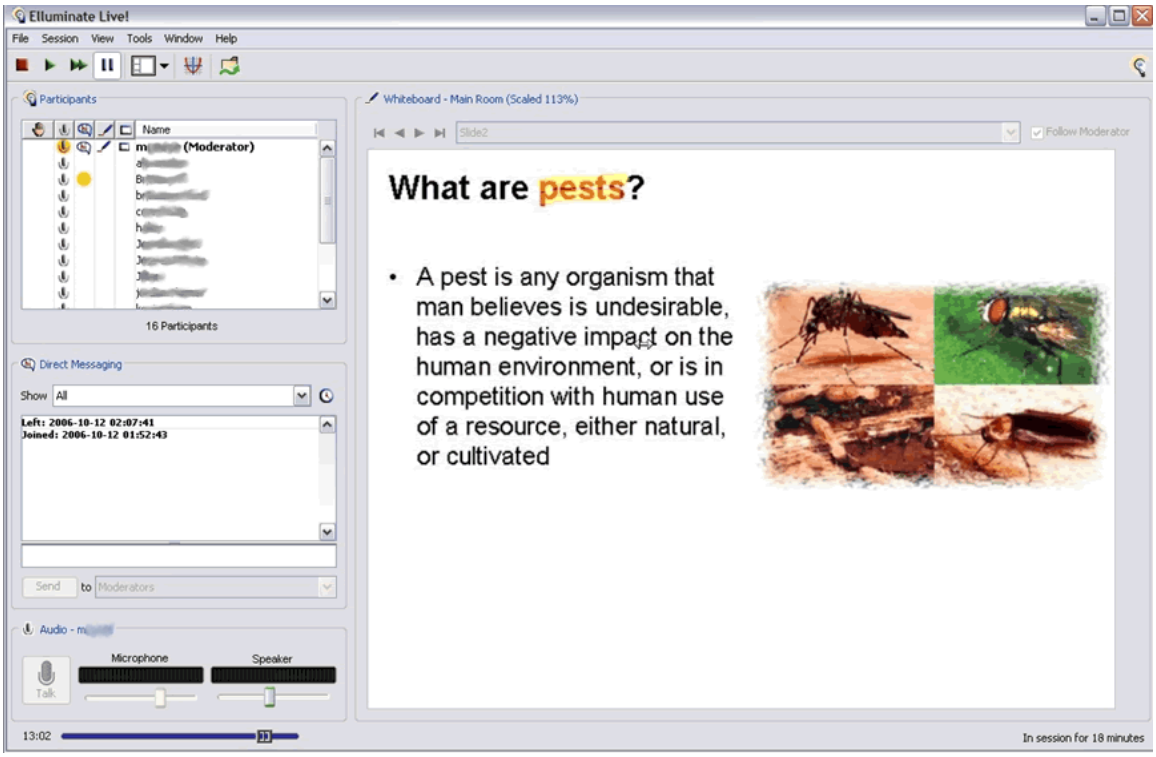

Figure 5.3. Example of a teacher lecturing with presentation slides

In this example, the e-teacher has turned off the public display of the direct messaging. This meant that students still had access to the direct messaging, but only the e-teacher was able to see what they wrote. This way the students were still able to ask the e-teacher questions or to let him know if they did not understand something, but they were not able to communicate with each other.

Instead of using presentation slides, some e-teachers used the course content found in WebCT to accompany their lectures (see Figure 5.4).

Figure 5.4. Example of a lesson from the asynchronous course content in WebCT

The use of asynchronous content was the least common approach; few e-teachers utilized the WebCT lessons during synchronous teaching. In fact, of the 27 synchronous classes that I observed none of the eight teachers used the WebCT lessons in their virtual classrooms. During the student interviews, three students reported that their teachers used the WebCT lessons in their synchronous instruction: the fine arts teacher who taught Jasmine and Kevin[16] and the science teacher who taught Kathy. In all three instances these students were the only student at Beaches enrolled in that course.

[16] See Appendix Q for a description of Kevin and the other three participants who were excluded from the analysis for this dissertation study.

Students' Synchronous Experiences

In addition to the similarities found between what we might expect a classroom teacher to do in a traditional classroom environment and what the e-teachers did in the virtual classroom, there were also many similarities between how we would expect students to describe their experience in a traditional classroom and how students described their experiences during their synchronous class time. For example, from my own experience as a teacher I believe that every teacher has a student who would describe their experiences in that teacher's class as "just sitting there and listening to the teacher" (JD). While not a very active form of participation, JD's quote at least indicated that the student was "listening." Fortunately for the e-teachers, not all of the students described their synchronous experience in such passive terms. JD even described in a later interview a more active participation, "if he [the teacher] says something important, I just flip back up to the screen and see what he is writing up and then write up what he's writing up or print it off."

In fact all of the students described active participation during their synchronous classes. In her language arts class, Mya described one of her synchronous classes:

> I'd have Elluminate Live up and the instruction, the instructor would be giving like the lesson that we would be reviewing that day, normally its just going over a part in a novel or something like that, and then we have to evaluate it and take roles in it…. we would type them all first and then we would copy and paste them into the direct messaging.

Similarly, Jasmine described her participation in a fine arts class where the teacher had introduced a new topic, "he was teaching us stuff about balanced art, so he was getting us

to answer some questions [on] which art was balanced and the different types…. We had to find pictures that had, like different types of balance."

Finally, Peter described how the e-teacher in his mathematics course would begin most of their synchronous classes:

> we would like go over something from last day or whatever and make sure that everyone understands it and then after we would just move on to something new, he would like put multiple choices on the board, ah, up on the whiteboard and we'd have to select which answer and then he'll just run through the answers or whatever like that.

These descriptions by JD, Mya, Jasmine, and Peter are consistent with the kinds of descriptions provided by all eight students.

Their descriptions are also consistent with the kinds of descriptions that might be expected in a traditional classroom: a student taking notes based upon their science teacher's lecture; students reading a novel aloud in an English class and then answering questions on the passage they had just completed; fine arts students searching through provided resources to find examples of a particular artistic concept; or a mathematics teacher beginning the class by reviewing the formula and sample problems from the previous class. One of the reasons that e-teachers and their students make greater use of their synchronous time for on-task activities may be because of these similarities to the traditional classroom environment. In his discussion of how innovations are diffused, Rogers (2003) described five perceived attributes that potential adopters base their opinions of an innovation on: relative advantage, compatibility, complexity, trialability, and observability. According to Surrey and Ely (2007), a person is more likely to use

something new if it "offers them a better way to do something; is compatible with their values, beliefs and needs; is not too complex; can be tried out before adoption; and has observable benefits" (p. 106). The virtual classroom utilized by the CDLI allows teachers to teach in a way that is compatible with how they have taught in the traditional classroom environment. Using primarily these teaching methods in the virtual classroom is not difficult or complex, at least in terms of things the e-teacher would have to learn to do with the actual software. Finally, in many instances e-teachers go from a traditional classroom environment at the end of one school year to a virtual environment at the beginning of the next with only a few days of professional development in between. There is little mentoring of potential e-teachers and very few classroom teachers use the tools utilized by the CDLI, so there is little time for e-teachers to try out all aspects of the virtual classroom before having to use it.

One aspect of the virtual classroom that is different than a traditional classroom that e-teachers seem to have adopted was alluded to by Peter when he said, "he [the teacher] would like put multiple choices on the board, ah, up on the whiteboard and we'd have to select which answer." The use of the polling feature to ensure that students were paying attention was seen as "a better way to do" this in a virtual environment where the e-teacher was unable to see their students. This fact was not lost on the students either. For example, Max described the need for this strategy in the virtual environment as:

> there's just not an actual teacher there to look at 'em [*sic*] and, you know, to look at 'em [*sic*] sternly and now that they got to pay attention and they will, but in [Elluminate] Live all you got to do is a check mark every now and then to see if you are paying attention.

This was similar to how Jasmine described this instructional strategy when she said, “my teacher usually gets us to say something or put up a checkmark to make sure we are paying attention.”

The need to “make sure [the students] are paying attention” during their synchronous classes was a realistic concern. For example, Constance indicated that sometimes “we also might have been checking our own e-mail or… MSN [instant messenger],” a practice described by all eight students. Further, JD stated, “sometimes I might check the [hockey] scores or something from some of the game.” All eight students described some form of off-task behavior that they would regularly undertake during synchronous classes. However, all eight students also stated that these behaviors usually occurred at the beginning of class when they were still waiting for some students to login or at the end of class once some students started to logout.

While students were much more productive during their synchronous class time, compared to their asynchronous class time, as Max indicated there was no actual teacher there to police the students and keep them on task. Even the use of the polling feature was not always an effective tool, as I discovered during an observation of the students during a synchronous language arts class. From the beginning to the end of class the three students talked about the school’s graduation, the up-coming trip to Signal City, what had occurred the previous weekend, what they were going to do this coming weekend, their plans for summer break, the movie *The Breakfast Club*, school spirit, and the list continued. During these conversations all three students were logged into Elluminate Live and one of the three students appeared to be responsible for paying closer attention, as she would periodically tell the other two to type this or click that.

While this particular class was a rarity, at least based upon my own observations, it is an illustration of the difficulties of the virtual environment for students who are being "compelled to assume a degree of autonomy they are not ready to handle" (Moore, 1973, p. 84). There were other examples of off-task behavior, for example there was a greater amount of conversation between the students in the distance education room than I was accustomed to as a classroom teacher and that I have experienced as a beginning teacher educator. This is not to suggest that the students were talking to each other on a continuous basis, on the contrary, based on my observations of 22 synchronous classes the amount of conversation between students was usually limited to 10-15 minutes out of a 60 minute class and, as it is indicated in the table below, much of that conversation was focused upon the content of the synchronous class. Table 5.2 is a summary of the percentage of conversation during the synchronous classes that was about the subject matter as reported by the students during each of their interviews, with the mean value being rounded to the nearest five.

Table 5.2. Percentage of the conversation about the subject area reported by the students

Student	Interview #1	#2	#3	#4	*Mean*
Cassandra	50%	30%-40%	25%	20%-25%	*35%*
JD	50%	40%	75%-80%	40%-60%	*55%*
Peter	40%	80%	N/A	50%	*55%*
Mya	75%	100%	100%	75%	*90%*
Jasmine	95%	100%	100%	100%	*100%*
Kathy	95%	90%	90%	50%	*80%*
Justine	N/A	65%	25% (math) / 50% (science)	10%	*40%*
Max	90%	50%	50%	80%	*70%*
Mean	*70%*	*70%*	*65%*	*50%*	***65%***

While the overall mean for the amount of conversation about the subject area was approximately 65%, it should be noted that two students had online classes where they

were the only student in that course (i.e., Jasmine's only class and one of the two that Kathy was enrolled in). During the interviews with these two students, the percentage of conversation that was not about the subject area would be low, as there was not anyone for them to talk to in most instances. If you remove these two students from the table above, the overall mean for conversation about the subject area drops another 10% to approximately 55%. So even though the synchronous time was the time when students were most on-task, there were still times when they were engaged in other, distracting activities.

The students' decision of whether to pay attention or talk about other things during their synchronous class time was based upon a number of different factors. For example, Justine described:

> Because physics is more, ah, demanding course, umm, and you really, really got to pay attention, whereas, and it is easier to fall behind, whereas math class is, is generally not very hard and if you do, sometimes you can get it, if you don't pay attention well you can just learn it when you go home, it's only, it's not that hard to learn when you go home, but physics, you really got to understand it when you are in class, it is really important.

The difficulty or importance of the course or the particular topic the e-teacher was covering was also mentioned by Max. "We'll talk every now and then, but if he's [the e-teacher] talking about something important, we'll pay attention."

Constance, however, was less focused on the relative difficulty of the course or the perceived importance of the content, as illustrated in this quote:

> If it is Friday we won't be talking about, we'll be less concentrated on work or before a holiday or something, probably, I don't know, just whatever mood we're in I guess…. it just, just wasn't one of those working modes and a lot of it too is that you're still paying attention in class and you know what's going on, it's just that the teacher is not there in front of you, so its more like a relaxed environment, like you can still carry on with class and still, you know, generally talk about things to [*sic*].

This rationale is consistent with the differences between adult and adolescent learners described by Knowles (1970). The CDLI students were students who were not as self-directed; who had not accumulated a variety of personal strategies and resources for their learning; who were still oriented to learning due to a requirement, as opposed to a specific goal-related desire; and who still possessed an orientation towards learning that is focused upon the subject, as opposed to being focused upon a particular problem. Essentially, without the external motivation of a teacher in the room, and only the virtual presence of a teacher to keep them focused, it should be expected that these non-autonomous or semi-autonomous learners do not stay on-task at all times. The external motivation of assignment deadlines, test dates, and perceived difficulty or importance of the content (which was usually related to its inclusion in an up-coming assignment or potential inclusion on an up-coming test) is strongly related to the degree of on-task behavior among these students.

Local Synchronous Learning Community

As it was described earlier in this section, the students reported to spending between 10-15 minutes per class (or 15% to 25%) talking to one another and

approximately 65% of that conversation was about the content being presented in that class. Max described this conversation as:

> it might be something about what's going on in class, if you got, well, if we don't understand what, cause usually one of us understands what's going on, we'll just talk about that for a second…. Just like say where'd he get that answer to and whatever, and the other person say yeah.

Kathy and Justine both described it in a much briefer fashion when they said, "sometimes if I have to ask them a question about stuff" (Kathy) and "if we don't understand something we ask each other" (Justine). Mya provided a more specific example from her language arts class:

> just general conversation about the novel, just like, umm, some, some people have difficulty remembering chapters in the novel and we'd tell them, you know, this, this is, this is so and so and this is how they know them or whatever, there were just the odd question for the most, for the most part, we didn't discuss much.

Mya's final comments are important, as they underscore the fact that this conversation was not something that happened throughout the class or even for a majority of the class.

It was not surprising that these students built a support community amongst themselves that they utilized during their synchronous classes. In Chapter Two, I described the stronger sense of community that is normally present in rural schools (Kannapel & DeYoung, 1999), and in Chapter Four, I described how the students themselves used terms like "friendly," "close knit," and "family" to describe their rural school. However, the further decrease from their regular small class size at Beaches All

Grade to an even smaller local virtual school class size increased the sense of community for these students. For example:

> There's only a few of us, but in class there's, but there's only a few of us in our French room, but, or the DE room, but in our normal classes there's probably more people, you know, you got more people there, so, like, I'd say it is more close knit, fewer people you have. (Constance)
>
> Probably because like we're in a smaller group and it is easier to get everyone together or something like that. (JD)
>
> I feel a lot closer to my online crowd because, like, I don't know, well, like I said before, we gets together in the nighttime and dos [sic] homework and that or whatever and we're always, I don't know, like being up in that little tiny classroom you get close to each other. (Peter)
>
> I know that over the last year we've gotten to know each other, umm through the course, but I would say like in person it's like a tighter community amongst students. (Mya)
>
> I'd say it is probably closer within our online ones because we're the only people that can talk to each other or whatever and we're the only ones that can help, can help each other. (Justine)

These students all felt that the smaller class size in their virtual school classes created a greater sense of community with their local virtual school classmates. Conrad (2002) described place-based communities, or communities that were physically together, as "like-minded groups of people [gather] together in the spirit of shared goals" (p. 4). In the case of CDLI, the shared goals focused on understanding the material that their e-teacher

presented. Cross (1998) believed that a learning community was intended to foster "active learning over passive learning, cooperation over competition, and community over isolation" (p. 5). CDLI students were quite active in their learning and cooperated to ensure that everyone who expressed confusion understood the material; students frequently asked each other content-based questions during synchronous class time. The series of quotations from Constance, JD, Peter, Mya, and Justine presented above certainly indicate that the students did not feel isolated, but that they and their in-school classmates were a part of their local learning community.

Interaction – Text Over Talk

As illustrated earlier, the two main methods that students had to interact with their teacher and the other students in the virtual classroom were through the microphone or through the direct messaging. While students did use both media, all but one student preferred to use the direct messaging when given the choice. This was consistent with Nippard (2005), who found that CDLI students in the 6 courses that he observed preferred to use direct messaging in their virtual classrooms. Most of the students who preferred the direct messaging did so because they were shy about speaking over the microphone in general or because they felt that they didn't know the online classmates. "I just don't like talking over the mic," said Jasmine, while Justine indicated "I guess I'm kind of shy using the mic." Mya was a little more practical about her discomfort with speaking out over the microphone, "I'm not comfortable with it personally… I just find it quicker and easier, you get more people talking at once rather than one at a time."

In some cases this utility approach was an indicator of how the students use these interaction tools. For example Constance indicated, "I might only have to ask a simple

little question or he might just say okay, use chat or use the mic please, but if it's just a little simple question I might just type it in rather than interrupt him." Justine, Kathy, and Mya all expressed similar sentiments. Peter, who was the only student who didn't express a preference for the direct messaging, was even more descriptive in this sense of utility, "…if it's going to be a long answer or whatever and like you wants to try to explain yourself or ask questions, you would use the mic or I use the mic, too much to type, but if it's like, only just like a number or whatever, you just type it in."

This pattern is similar to events in a traditional classroom – some students don't mind speaking up, but just as many or more prefer to not speak. Another possible explanation, however, may lie in the sense of community that existed between the students at Beaches and their virtual school classmates. Unlike the tight local community that had developed, there was little sense of community within the virtual environment. "I don't even know most of them, don't know what they looks [*sic*] like, only knows [*sic*] their names," indicated Peter. This was fairly consistent with comments made by all but one of the eight students. Mya was the only student that relayed any sense of familiarity with her online classmates.

> Even though it was through the computer, you got to know certain characteristics of certain people, like who, who talks more, who didn't, umm, how people responded like, I don't know, their level of participation and the content of it and everything, like you could tell who was who by their style.

However, all of the other students were more definite in their responses. For example, "I don't really know my classmates" (Peter), "I don't really talk to them" (Jasmine), or "I

don't really know them" (Justine), with them representing their virtual school classmates not physically at Beaches All Grade.

While the lack of familiarity with their online colleagues did decrease the amount of verbal interaction and increase the amount of written interaction that the students had, it didn't decrease the overall amount of their interaction. As Mya described it:

> I wouldn't say it decreases the amount, I think it, I think, I think online courses are good for that reason, because some people are shy when it comes to speaking out and asking questions and direct messaging allows you to offer those without worry about what you might say or think or whatever, like if you clearly understand, like I know I've been in classrooms and had a question and I didn't ask it because I didn't know if it was appropriate or if I'd look stupid by asking it, but, ah, I think that's why online courses are good because it makes you feel comfortable talking on the mic, well, if you are used to it then it works pretty good and if you don't, you can always direct message.

Seven of the eight students expressed similar views that the way that they chose to interact did not decrease their level of interaction. The exception to this was Max, who stated, "I probably won't make certain comments because I don't know how certain people would react, so I just keep my mouth shut." I would speculate, given this quote, that these comments would not necessarily be related to the class content and that even Max's level of on-task interaction was not affected by the lack of familiarity with his virtual school classmates.

A sense of community or a connection between learners is affected by, among other things, the level of social presence felt by the learners (Gunawardena & Zittle,

1997; Rovai, 2001). Short, Williams and Christie (1976) defined social presence as "the degree of awareness of another person in an interaction and the consequent appreciation of an interpersonal relationship" (p. 66), while Garrison and Anderson (2003) define it as "the ability of learners to project themselves socially and emotionally into a community of inquiry through the mediums of communication being used" (p. 49). The students reported two e-teachers had students send in pictures and information about themselves, which the e-teacher used during a synchronous class to introduce the students to each other. However, the CDLI students at Beaches still did not feel that their online classmates projected themselves in any way that fostered any meaningful relationship.

The two variables that make up social presence are intimacy and immediacy (Short et al., 1976). Tu (2002) stated that intimacy included things such as "eye contact, physical proximity, and topic of conversation" (p. 133), while immediacy was "the psychology distance between a communicator and the recipient of the communication" (p. 134). The tools included in the virtual classroom, along with the students' use of emoticons and other linguistic features associated with text messaging, allowed the students to exhibit some level of intimacy, however, the CDLI students at Beaches felt a high degree of distance from their online classmates, which accounted for the perceptions of a low level of social presence and the perceived lack of community that existed with their online classmates.

Research Question Two: What were the students' experiences during their asynchronous time online?

The current method of delivery utilized by the CDLI includes anywhere from 30% to 80% of the students' scheduled time in synchronous instruction: social studies and fine arts had 30% to 50% synchronous; mathematics, science, and English language arts had 50% to 60% synchronous; and French as a second language had 80% synchronous. However, the original mandate of the CDLI was to develop a method of instructional delivery where "most communications be through an Internet-based system incorporating e-mail, conference forums, Internet fax, and similar devices, with minimal reliance on synchronous communications, fixed schedules or other constraining elements" (Sparkes & Williams, 2000, p. 73). Even with the high percentage of synchronous instructional time scheduled, as indicated on the CDLI website the primary method of interaction between students and their teachers is supposed to be asynchronous and one of the more substantial investments they make is in the creation of asynchronous course materials that:

> are integrated to work with a Learning Management tool called WebCT, which forms the foundation on which the rest of the asynchronous supports are constructed. WebCT supplies a number of tools and features to aid the student in achieving course outcomes, including:
>
> - Course Calendar which is continuously updated by the e-teacher and which contains important day-to-day information such as schedules, deadlines and notification of upcoming events such as tests and synchronous classes;

- WebCT E-mail which provides an easy-to use asynchronous method for communications that are not time-critical;
- Threaded Discussion Forums which offer opportunities for students to engage in cooperative learning activities and to extend the depth of their understanding of any given concept; and
- My Record which is a feature that allows students to continuously monitor their own progress and achievement. (Centre for Distance Learning and Innovation, 2007, Asynchronous Interaction, ¶ 2)

However, the reality is that only a small percentage of the instruction that is provided by the CDLI takes place during asynchronous time. Although some CDLI e-teachers actually used the asynchronous time by assigning their students to complete instructional activities through which they are supposed to learn new content or at least have previously presented content re-enforced (as illustrated below in Figures 5.5-5.13), these instances were isolated. Overall, it appeared that most CDLI e-teachers attempted to teach the complete content of their course during the scheduled synchronous time.

As it was described in Chapter Four, the CDLI has contracted teachers and web designers to create asynchronous course content to support students in their virtual schooling experience. In fact, this course content includes all aspects of the course and students would actually be able to go through each of the lessons; where they would be introduced to and provided information on the topic, have an opportunity to practice or use that information, and even complete a self-test to ensure that they retained the information for the entire course asynchronously using this material, if they were so inclined. However, of the eight students that were part of this case study, only two

students reported using the course content in WebCT. Both of them had e-teachers who used the asynchronous course content as a part of their synchronous instruction. None of the remaining six students made use of the asynchronous course content. Instead of using the course content that was described in Chapter Four (see Figure 4.1), many e-teachers have chosen to create their own notes and post them in WebCT for students to access (see Figure 5.5).

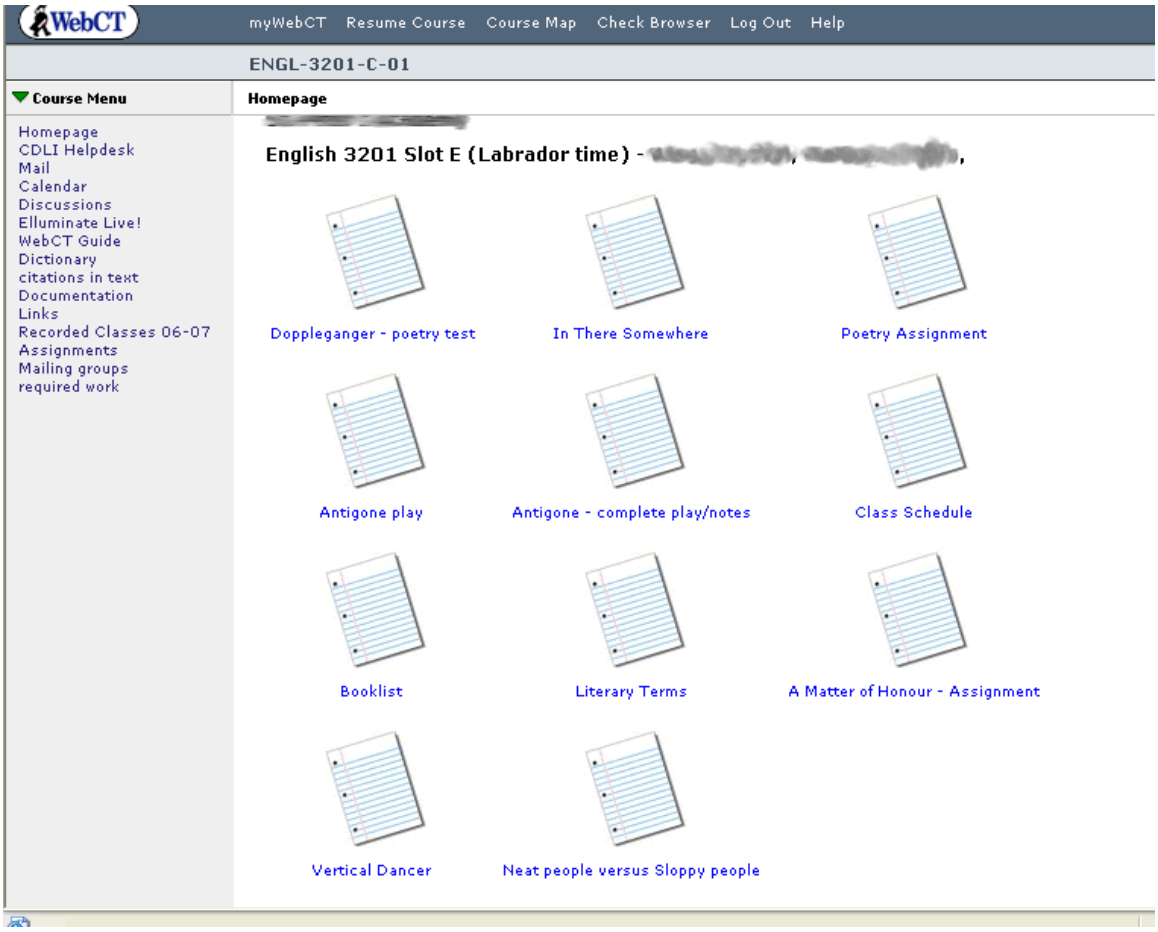

Figure 5.5. Example of teacher-created notes being placed in WebCT

I am not suggesting that this is an example of a poor instructional practice, but I mention it because in addressing my third research question language arts students frequently mentioned using these notes in WebCT as a source of content-based support.

This is also not to suggest that posting additional notes was the only way in which WebCT was used to support these students. One of the primary ways e-teachers used WebCT to support the students in this case study was as a means to announce tests, assignments, and other course related or CDLI activities and as a way to deliver and receive the submissions for a variety of assessments (see Figure 5.6).

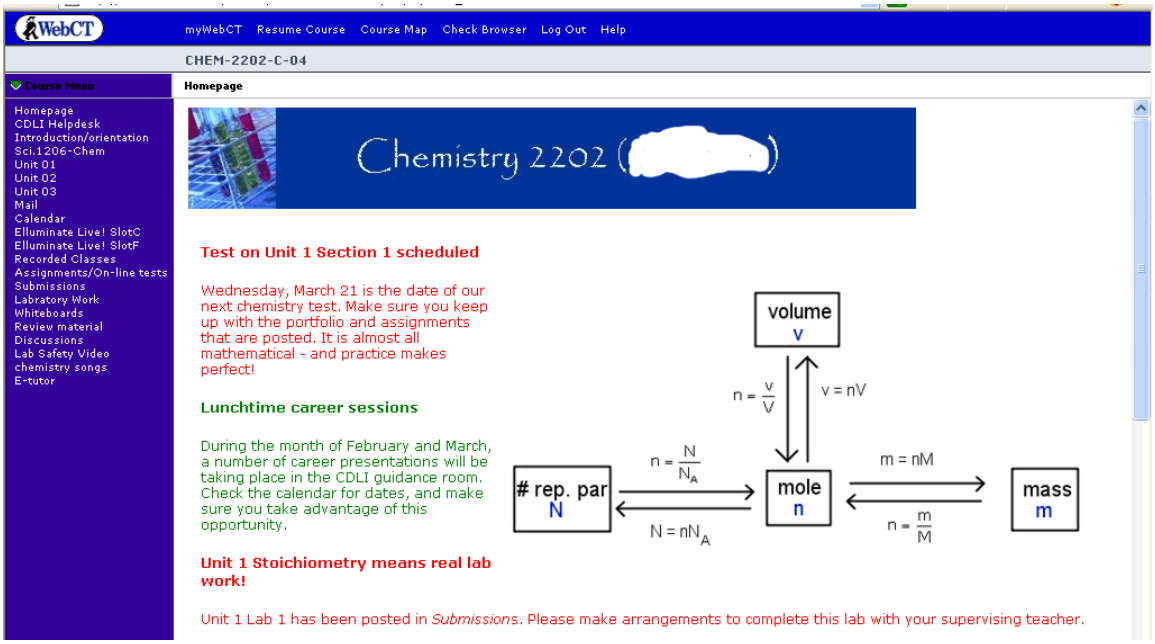

Figure 5.6. Example of announcements on the main WebCT homepage

For example, the image above shows the announcement of a test date, along with a lab assignment and where students should go in WebCT to submit that assignment. This was not the only means that teachers could make an announcement within WebCT. Some e-teachers used the calendar feature or the discussion forum to make announcements (see Figures 5.7 and 5.8).

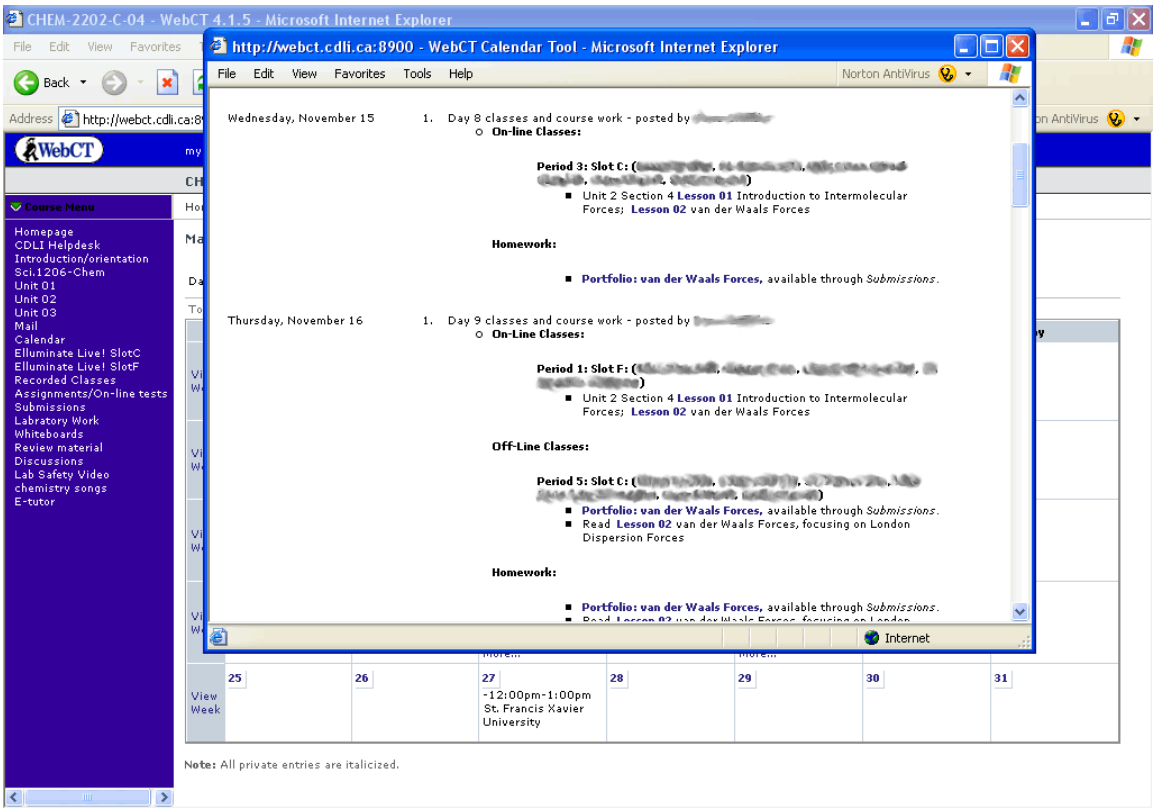

Figure 5.7. Example of the WebCT calendar being used to post announcements

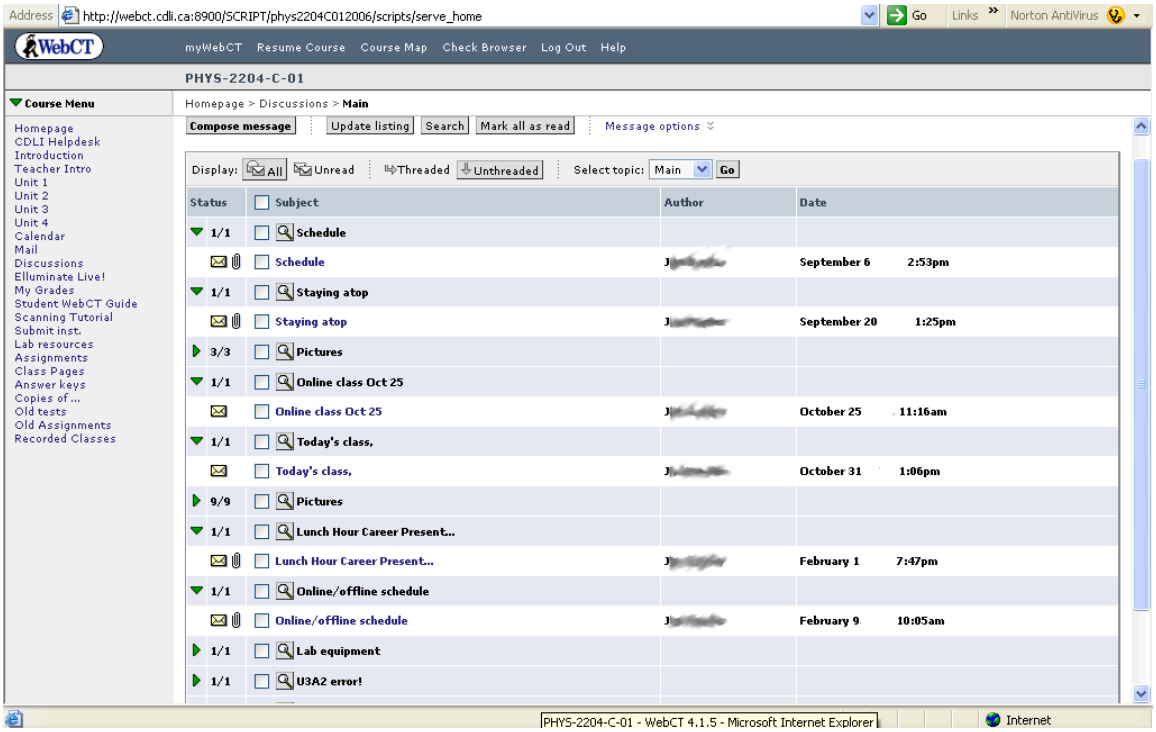

Figure 5.8. Example of the WebCT discussion forum being used to post announcements

The discussion forum was also used to submit assignments. By using the discussion forum in this manner, all of the submissions were available for any student to view (see Figure 5.9).

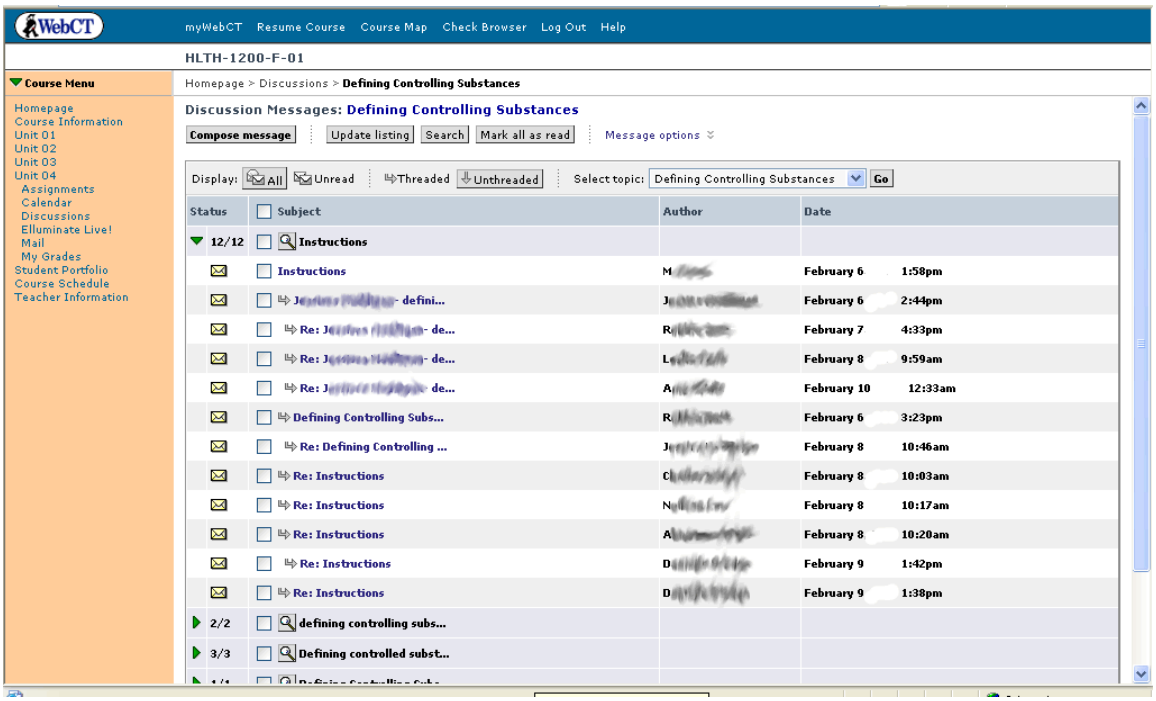

Figure 5.9. Example of the WebCT discussion forum being used to submit assignments

Another common way the e-teachers used WebCT was as a way to house recordings of their synchronous classes. Most of the e-teachers would simply label each recording based upon the date that it was recorded or the topic that was covered during that particular synchronous class. However, a few e-teachers included the specific unit, section, and lesson that was covered during that synchronous class (see Figure 5.10).

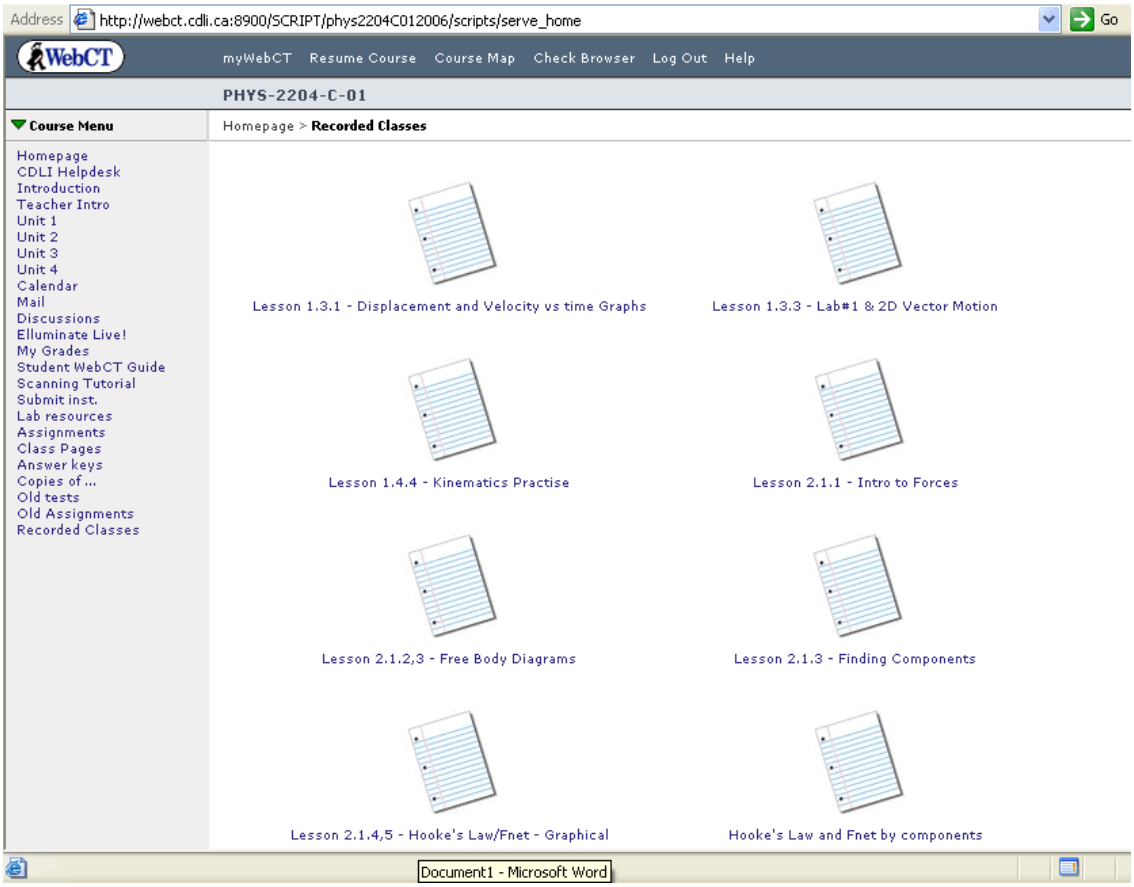

Figure 5.10. Example of synchronous class recordings being by unit, section, and lesson

For example, the icon and link to the recording that appears in the top left corner of this image is for a lesson on displacement and velocity versus time graphs and it corresponds with Unit 1, Section 3, Lesson 1 of the asynchronous course content (which is illustrated in Figure 5.11).

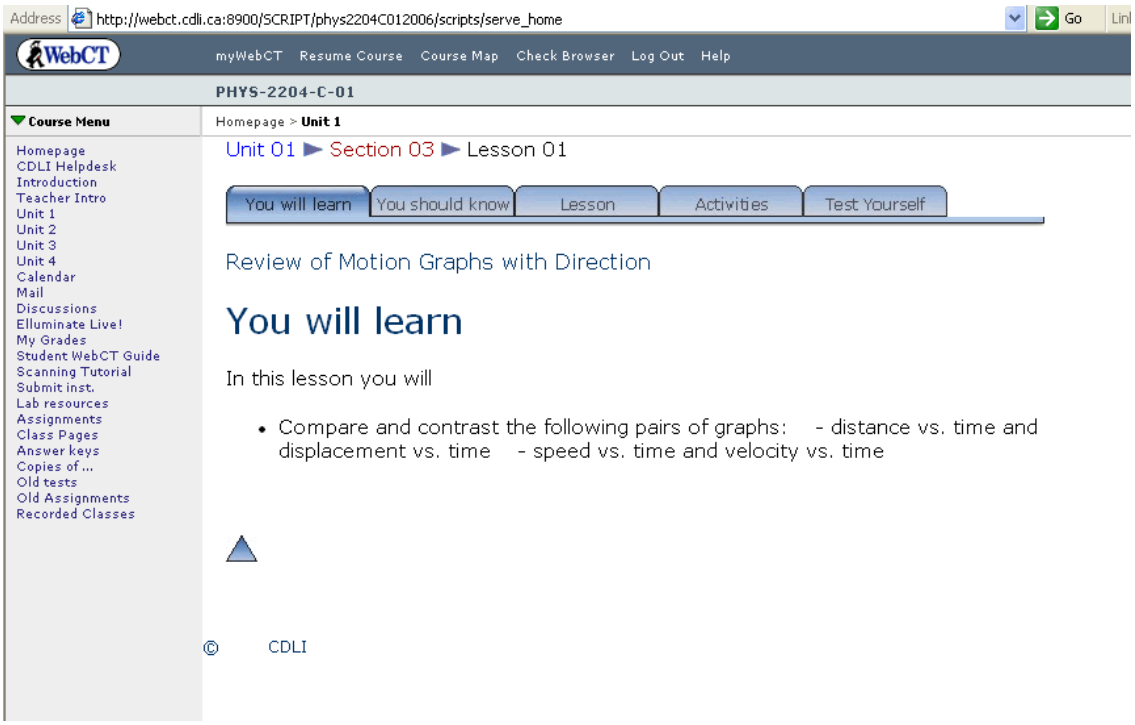

Figure 5.11. Unit 1, Section 3, Lesson 1 from the grade eleven physics course

This is significant because of the eight courses taught to students at Beaches All Grade, only one e-teacher labeled their recorded classes using the unit, section, and lesson; none of the four students in that course knew what the numbers meant or that the numbers corresponded to a specific lesson in their asynchronous course content that they could review.

Although many of the examples discussed in this section were ways in which e-teachers used WebCT in a positive way to support their students, such as posting announcements and using the assignment feature of the learning management system to provide students with access to their marks, they do not constitute using the learning management system for the purposes of instruction. Instead, the teachers tended to use WebCT for its course management functions. For example, some e-teachers used the calendar tool as a way to notify the students of what content will be covered during the synchronous classes and what content the students are expected to cover on their own

during their asynchronous classes using the course content that is housed in WebCT. The image below of a Healthy Living class is a good illustration of this, where the teacher has indicated that on March 6 there will be a synchronous class using Elluminate Live and the following asynchronous class on March 9 the students are expected to complete the lesson on "The Caffeine 'Buzz'." This e-teacher has even linked the lesson directly to the calendar so that when students click on that entry, the lesson to complete opens up in a separate window (see Figure 5.12).

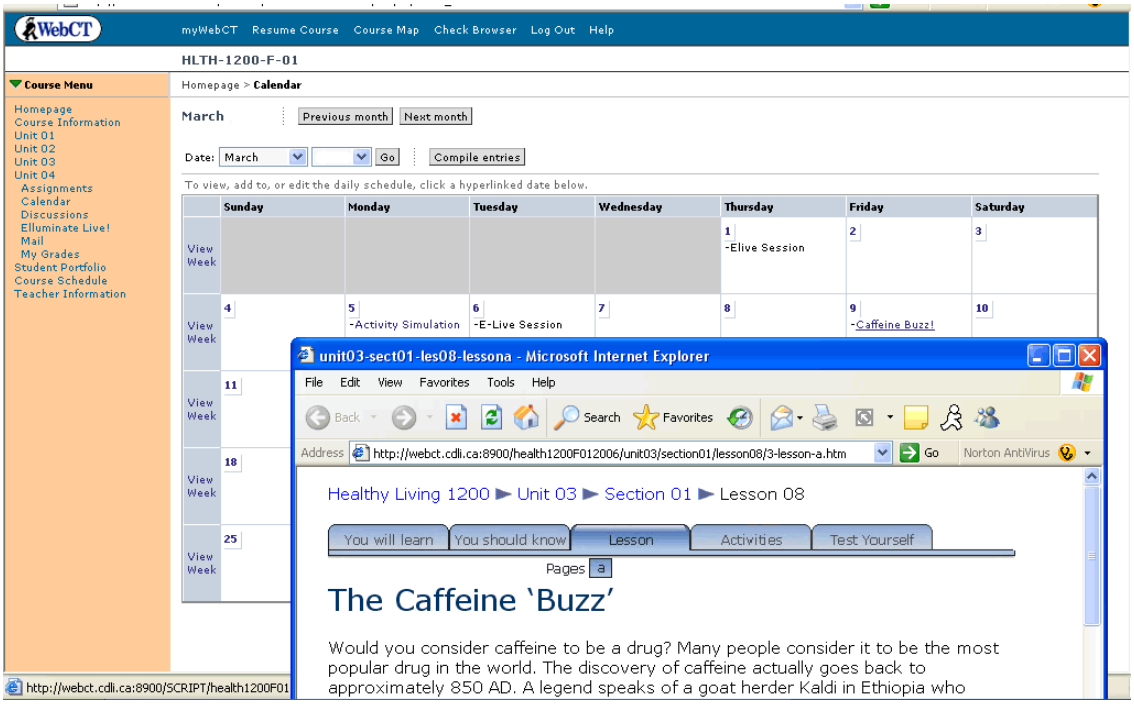

Figure 5.12. Example of WebCT calendar being used to facilitate students' use of the asynchronous content for instructional purposes

In this model, the e-teacher would have presumably covered Unit 3, Section 1, Lesson 7 during the synchronous class on March 6th. Using the WebCT lessons in this manner allowed e-teachers to spend the appropriate time allocated to each topic, as opposed to trying to cover the entire course in the 30 to 80 percent of the time allocated to synchronous instruction.

Another way in which WebCT was used for instructional purposes was by using the discussion forum tool. While the posting of announcements and allowing students to see each others' assignments are useful instructional strategies, and can both be done in specific areas within the WebCT discussion forum, some e-teachers also used the discussion forum as a way for students to simulate the kind of discussion that a classroom teacher might conduct on a divisive issue. For example, students in this class are discussing how controlled substances are defined by the law (see Figure 5.13). Some of the responses are replies to comments made by fellow students and not a reply to the e-teacher's original prompt. Further, students made multiple posts to this discussion.

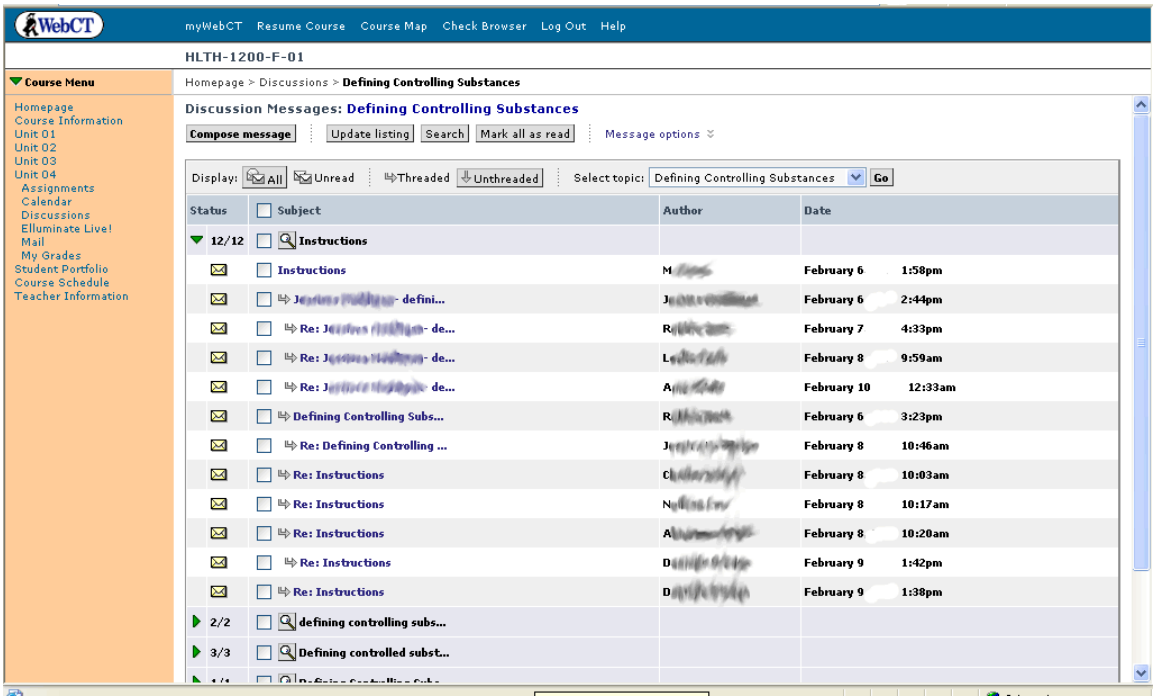

Figure 5.13. Example of the WebCT discussion forum being used to discuss an issue

Some of the e-teachers of the eight classes that had Beaches All Grade students enrolled used this asynchronous instructional strategy. However, their use of this strategy was limited to two or three discussions for the entire year.

Of the e-teachers of the students at Beaches All Grade, only the fine arts teacher required the students to complete lessons from the course content on a regular basis. For the most part, students were assigned one of four activities to complete during their asynchronous class time:

1. questions about something the student had read or that allowed them to practice a new mathematical or scientific formula;
2. an opportunity to work on up-coming assignments;
3. for students in one of the science courses, an opportunity to complete hands-on laboratory work; and/or
4. for the students in language arts, an opportunity to read various poems, short stories, novels and plays that they were assigned.

For some students, this was more than enough work to keep them busy for each of their sixty minute asynchronous classes. However, some were able to complete this work in just a fraction of that time, while even more made the conscious decision to complete this work at home.

Students' Asynchronous Experience

The students reported that they were assigned a variety of work during their asynchronous class time. For example, Mya described one of her asynchronous language arts classes:

> I was reading, I had to catch up with everyone else because we had to get the book read before Easter Break and I only had a couple of pages, a couple of chapters left, so I read my book and finished that up, and we had to add to our notes, so I did that too, but I was done that during the first half hour of class.

Along with being given time to read her novel and add to her journal assignment, which would be submitted when the students were tested on this novel, Mya also reported that her e-teacher had them respond to a discussion posting, "they'll [the e-teacher] put topics up and stuff and you have to respond to them and state your position to them, whether you agree or you disagree and why."

Jasmine, whose fine arts e-teacher made regular use of the course content, while describing one of her recent asynchronous classes stated, "I was probably reading my lessons and looking at my assignments." When asked what kind of assignments she normally had to complete, she responded, "every now and then he [the e-teacher] might ask s us a few questions on it [the lessons in WebCT], but mostly we dos [*sic*] drawings."

Constance summarized the different types of asynchronous work the students were asked to complete.

> I call it three different kinds of homework, there's homework, like in French to help you understand it more, and then there's your assignments which he helps to grade, it helps him grade you, and like some of the homework assignments, like he doesn't even correct, or he might just go over and if anyone has a question, whereas with the actual assignments we have to, like, to scan them in or type them up and e-mail them in or what not.

As she saw it, her asynchronous work consisted of work she completed to gain a better understanding of the subject area, assignments that she completed for a grade, and assignments she submitted just so her e-teacher knew that the work was done. JD expressed his view of the asynchronous work in more pragmatic terms:

> Usually like you're assigned so many questions for each offline class and then at the end of the month or something like that, he'll want them all done, like, usually like, I usually waits until towards the end of that month and come home and get them all done.

Even though JD and Constance were in the same class (JD was also enrolled in a second class), JD's view of the asynchronous work consisted only of assignments which had to be submitted to his e-teacher, and those weren't worked on until the deadline drew near (and even then he appeared to work on them at home). The lack of regular use of the asynchronous class time to complete assigned work and the need for external sources of motivation, such as the assignment deadline, are discussed in the next section.

Students' Work Space

Overall, when the students completed work during their asynchronous class time they were working in one of three locations. Students in the fine arts, language arts, and one of the science courses where there was only one student primarily worked at their computers at the school (see Figure 5.14). "We usually work at our individual computer workstations," said Mya of herself and her language arts classmates.

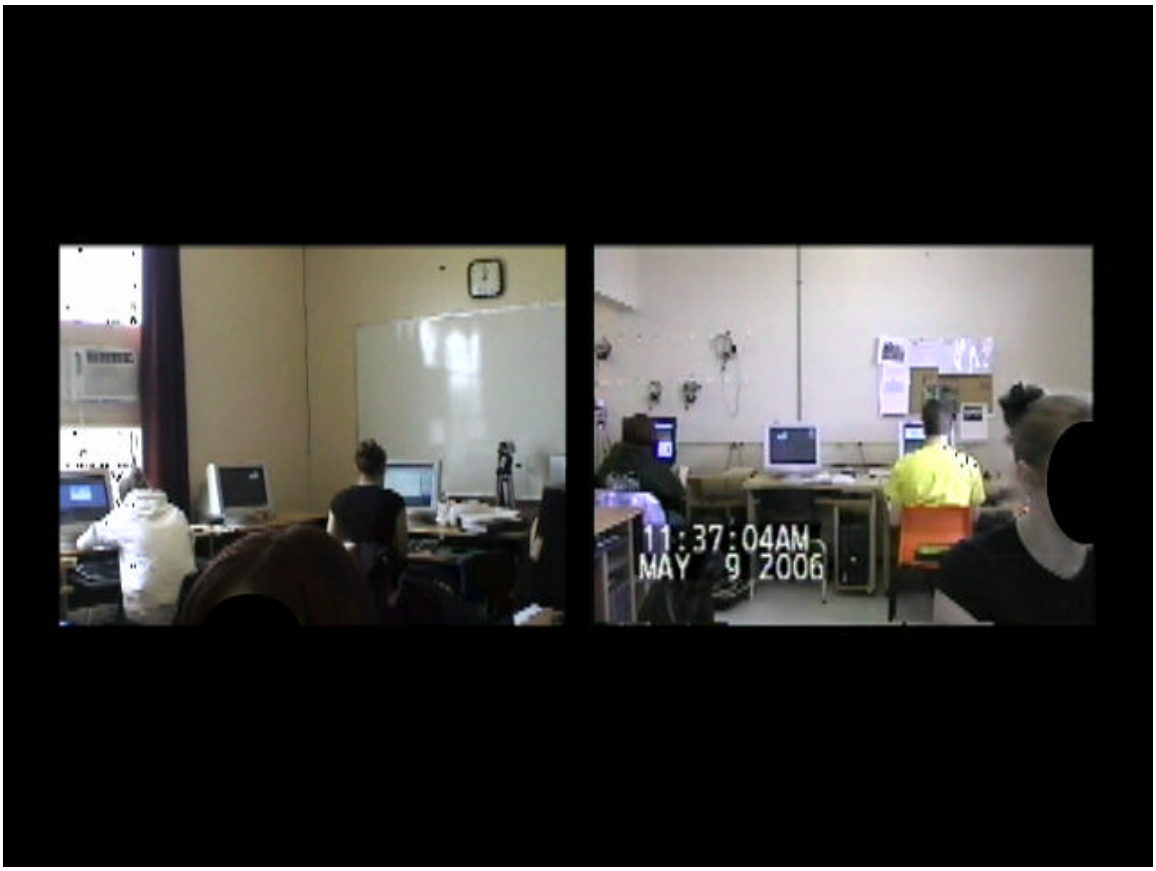

Figure 5.14. Example of students working at their computer workstations

Students in the other language arts course also reported similar patterns, "[I'd be] working at the computer desk because you would be using it [the computer]" (JD) and "usually I do it just on my computer desk because most of my work this year is just on the computer anyway" (Constance). The fine arts student, Jasmine, when asked how often she worked at her computer replied, "mostly all the time."

Students in the mathematics and the other science courses primarily completed their work in the smaller room inside of the distance education room that was set off from where the computers were located (see Figure 5.15). As Peter described it, "there's a room, it's like split and our computers are in one spot and there's like a desk in another spot…. So we would go out there and work on our questions."

Figure 5.15. Example of students working in the room within the distance education room

This was confirmed by two of the other three students in those classes who indicated, “we usually goes [*sic*] out in that little room” (Max) and “usually we’re out in that little room” (Justine). Max also provided a description of how the students usually completed their work in that little room.

> We all are working on our questions by ourselves and then, ah, ah, we figure it out and say everybody, everybody got the question done or whatever and if we got the same answer, we say alright then go on, but if we don’t we’ll get to together and figure out who went wrong where or whatever.

Students' reliance on each other during asynchronous class time parallels their interactions during their synchronous classes. Students' view of each other as their primary source of assistance is discussed further in response to research question three.

The students in the two science courses also completed work during their asynchronous class time in the science lab. Justine described this location a lot in her interviews, although all four students who took science courses referenced working in this space.

> For our last lab, we had to set, construct a ramp and we had, we needed a lot of space, so that's where we went to in the lab…. Because we're trying to get actually everything calculated because we don't want to spend another class down there, like, like, like we have to get, we're trying to get more done when we are down in the lab because next class our teacher might be using it, so we try to get as much done as possible that we can get done.

Justine described the students' time in the lab as productive when the students were working on the task, because that space may not be available when these students had their next asynchronous class period. Decisions based on external factors, such as this one, accounted for a lot of the rationale as to whether or not students decided to use their asynchronous class time to complete work.

Asynchronous Time on Task

As was alluded to earlier in comments made by JD and Justine, the lack of actual asynchronous instruction and the allocation of asynchronous class time to complete homework and assignments led to the students often engaging in activities that were not

related to their virtual school courses during their asynchronous class time. For example, Constance described that during her asynchronous classes:

> I could just be talking to my fellow classmates, we could just be chitchatting about something, or I could be checking my e-mail, I could be on a friend's website, I could be, ahh, on a radio station site, I could be looking at song lyrics, or anything like that.

Given that only 30% of her virtual school course was formally scheduled as asynchronous class time there was a significant number of activities to engage her time.

In some instances these off-task activities were due to the fact that students had already completed their asynchronous work, either during a previous asynchronous class or at home. "Sometimes we got [*sic*] nothing to do" (Peter) or "he didn't have any work assigned during that time, it was just that we were supposed to finish a novel over Easter break and I had it all done" (Kathy). However, in some instances it was a conscious decision to stop working on their assigned activities, as Mya described, "I didn't really give myself any free time except for the last fifteen minutes of class…. Even if I'm not finished up, I'll still give myself fifteen minutes." Fifteen minutes of a 60 minute class was 25% of her asynchronous class time.

In some instances, this off-task behavior occurred while the students tried to complete their work. Justine described one such situation from one of her asynchronous science or mathematics classes:

> Probably five or ten minutes, talking and then we're like, okay boys, we got to get started…. Every few minutes we'd get sidetracked and then we'd be like, okay, we got to finish this question, I'd say yeah, every few, every few minutes.

In terms of how much time the students were actually engaged in on-task activities during their asynchronous class time, Table 5.3 indicates the percentage of time reported by the students in each of their interviews, with the mean being rounded to the nearest five.

Table 5.3. Percentage of time the students reported they were working on the subject area

Student	Interview #1	#2	#3	#4	*Mean*
Cassandra	75%	60%-70%	30%-40%	0%	*45%*
JD	0% (math) / 100% (lang. arts)	60%-75%	0%	0%	*30%*
Peter	50%	80%	N/A	90%	*75%*
Mya	75%	33%	30%-40%	95%	*60%*
Jasmine	50%-60%	60%	100%	100%	*80%*
Kathy	80%	100% (science) / 0% (lang. arts)	0%	10%	*40%*
Justine	N/A	65%-75%	80%	100%	*85%*
Max	75%	75%	50%	50%	*65%*
Mean	*65%*	*60%*	*40%*	*55%*	***55%***

Overall the students self-reported that they spent a little more than half, or approximately 55% of their asynchronous class time engaged in on-task activities. However, based upon my own observations of 16 asynchronous classes, students spent less than a third of their asynchronous class time engaged in on-task activities. As I noted in Chapter Three, the month of the school year chosen for these in-school observations was one with more co-curricular and extra-curricular activities (i.e., disruptions) than an average month. Even given this context, students spending somewhere between 30% and 55% of their time on off-task activities was a significant portion of wasted time.

This lack of attention to their virtual school course work during asynchronous class time was also noticed by their in-school teachers. For example, Mr. Gerry Browning reported:

> I'll walk by the, ah, distance ed room there when the door's open and, what are you [*sic*] at today guys and girls, oh nothing sir, I got nothing to do, right they don't, you know, they got an offline period they think they got nothing to do…. Fifteen minutes before recess someone going to the canteen to see if they can get their chips early.

This was consistent with an observation made by Mr. Dennis Boyd about a group of fine arts students from the previous school year, "they were very slack in that class…. Everybody was in the same boat and it made it hard for say a science student sitting next to them." This domino-style effected, that if one or more students are off-task it can make it difficult for other students in this unsupervised environment to stay on-task was apparent during my in-school observations. One of the fine arts students, Kevin (who is one of the four students excluded from my dissertation analysis), had class at the same time as one of the mathematics classes. In my observations of the students in the mathematics class, I calculated that they spent approximately 20% of their three asynchronous classes that I observed engaged in on-task behavior – with the two female students, Justine and Norah[17], spending a higher percentage on-task than the two male students, Peter and JD. For these four students the main reason for their off-task behavior was their interaction with Kevin.

Along with the distractions by other students, JD tried to describe another reason why students engaged in off-task behavior, "I guess its at the time in the school [day] and you just had another class and you kind of, I don't know, takes [*sic*] a break or something

[17] See Appendix Q for a description of Norah and the other three participants who were excluded from the analysis for this dissertation study.

for a while in that class." Constance articulated a rationale that all eight students described in varying levels of detail:

> Pretty much the mood we're in, I guess or what it depends on, if it's a big assignment and we needs help from each another then, you know, we'll probably try and get it done, as much of it done as we can, but if it's just like, little, like write a paragraph or so on something, then we'll be like, well we can do that at home, you know, so we'll wait or if the assignment got to be due the next day we'll probably do it then, but if it's not due 'til next week, then we'll probably do it at home or at a later time.

As it was indicated earlier, it appeared that external factors (such as assignment deadlines and test dates) were the primary sources of motivation for these students during their asynchronous class time.

In their analysis of the literature, Roblyer and Marshall (2002-2003) identified nine constructs they argued were related to success in virtual school courses. One of these nine was an internal source of motivation, as opposed to external sources. This particular construct was included in the "Achievement and Self-Esteem Beliefs" factor in their Educational Success Prediction Instrument (ESPRI) – an instrument designed to predict student success in virtual school courses. In their validation study of this instrument, this factor was found to have the highest level of reliability in predicting student success ($a = .91$). In their own scores on the ESPRI, the students at Beaches scored relative well on this factor ($\mu = 2.04$), which may explain why all eight students were successful in their virtual school courses, at least to the extent that all eight students passed. However, it

doesn't explain the high amount of off-task behavior during the students' asynchronous class time.

Weiner (2003) found that motivation was critical to virtual school students' successful completion of their work and of the virtual school course. She also found that these students were able to develop the responsibility necessary to be successful in this environment by participating in a structured online course. Most of the CDLI students' asynchronous class time was unstructured and students often had no work to complete or were able to complete that work on their own at a later time. This might help explain why the CDLI students didn't develop the discipline and self-motivation that Weiner found to be critical factors for the students in her study.

Research over the past decade on motivation in the traditional classroom has found that students are more motivated to complete challenging tasks in an environment that allows for collaboration (Miller & Meece, 1997, 1999; Perry, 1998; Perry, Nordby, & VandeKamp, 2003; Perry & VandeKamp, 2000). These findings were consistent with previous research that had reported students often found tasks that lacked challenge or that were simple and/or routine as boring (Blumenfeld, Mergendoller, & Swarthout, 1987; Deci, 1975; Harter, 1978; White, 1959). The nature of the work assigned to the CDLI students during asynchronous class time was often routine or presented little challenge. This caused a lack of intrinsic motivation towards the completion of many of these tasks. Without this internal source of motivation, the students were only motivated to complete the work through an extrinsic system of rewards (i.e., grades) and punishments (i.e., deadlines) (Pintrich & Schunk, 2002).

Virtual School Course Workload

Another theme from the student interviews related to the students' work was the perceived difference in workload between the students' virtual school and classroom-based courses. All eight students indicated that the workload in the virtual school course was unevenly distributed. For example, Mya described the situation in her language arts course as:

> the fact that sometimes we got a lot of work put on us, like we have to read certain books, I hate being pressured, but I read, umm, like we have to read a book, like say in three weeks, and I have no trouble with that, but while you're doing that, like every week like you have to answer eight long answer questions and you might have an assignment due in two weeks, that doesn't relate to the book, but is about English itself, it could be about poetry or something that we're doing, so sometimes I find the workload can be a bit much

While Mya and the other language arts students did not feel that their CDLI courses were more work, later in the same interview she indicated that the distribution of work was assigned in "peaks and valleys, sometimes like, right now we don't have any work," as a way to contrast the initial view she depicted.

Unlike students in the language arts course, all of the students in one of the mathematics and one of the science courses indicated that they had more homework in their online course compared to their classroom courses. Similar to the account provided by Mya, Peter described of his mathematics and science course, "sometimes you got three or four assignments to do at once… you just does [*sic*] one and now we got [*sic*] another one, before we has [*sic*] the other one posted, we'll have another one to do, so

they're coming at ya [*sic*]." The students in this one mathematics course and one science course felt that their CDLI course had a heavier workload than their classroom-based courses. For example, in one exchange with Justine she stated that her online courses required more work at home than her classroom-based courses.

> *"Okay, alright, when you compare the two, like when you think about your online classes and your classroom classes, do you think that there is a difference in the workload between the two?*
>
> Um hmm, yeah, a big lot.
>
> *Okay, how so?*
>
> Umm, in the online classes there's more structure and there's more assignments and they got to be in this certain time, there's way more work in online classes I'd say, with the assignments, they're so like, they're really structured and you just send them out, two assignments before every test, but when we are downstairs, we're like, oh yeah, maybe we'll have an assignment coming up or something like that.
>
> *Okay, umm, is it more work in school, more work at home, or both?*
>
> More work at home.
>
> *Okay, so the amount of work you do in school for your online classes is about the same you do for your classroom classes?*
>
> Ahh, in school, hmm, yeah, but majority, majority of work I do for online courses is home."

Consider that over her four interviews Justine indicated that she only spent approximately 85% of her asynchronous time on subject matter items. Also, the asynchronous class she

described during her final interview was one where the students worked with one of the in-school tutors, which operated much like a classroom-based course would have looked. If this final interview is excluded because it was such an exception to her normal asynchronous classes, the amount of time she spent on task during her scheduled asynchronous classes was approximately 75%.

As indicated in Table 5.3, Justine was the student who reported to spending the greatest percentage of her asynchronous class time engaged in on-task activities. However, five of the eight students indicated that their virtual school courses were more work than their in-school courses. For the students who were academically successful in these virtual school courses, they were required to follow the advice given by Norah in her profile – "You have to do the work, you can do it in school or you can do it at home, but it has to be done!"

Research Question Three: When students required content-based assistance, where do they seek that assistance and why do they choose those sources?

The intention of the CDLI is that it has the primary responsibility for the instructional support of the students who enroll in their virtual school courses. In the same way a classroom mathematics teacher assumes the primary responsibility for instructing his students, the CDLI does not intend to shift this burden from its own e-teachers to the school-based staff. In a memo from the then CDLI Director to schools participating in the CDLI program, the CDLI instructed that school-based personnel were not to provide "regular instructional or tutorial assistance" (W. Sheppard, personal communication, April 23, 2001). This was consistent with the original vision for the CDLI laid out by the Ministerial Panel's recommendation that school-based teachers

would not have "direct responsibility for course preparation or instruction" (Sparkes & Williams, 2000, p. 78). Barbour and Mulcahy (2004) outlined that one of the reasons for these decisions was the "widely known, but rarely documented, [fact] that students often required and received a significant amount of assistance with matters of content from school based personnel" in the traditional distance education program (New Model for Distance Education, ¶11), and a concern that with the expansion of distance education in the province even more responsibilities for and time engaged in instructional support would be required of teachers that participated in this new virtual school – particularly with the original mandate and pilot testing of a largely asynchronous model for delivery.

Recognizing these realities, along with the CDLI's continued goal for a greater percentage of the instruction to be asynchronous, the CDLI established a number of alternate methods for students to seek assistance when they required content-based support. Two of the initial initiatives that the CDLI became involved with were the two tutoring programs the provincial government had created. Through these programs, schools, including the CDLI, are able to hire upper year high school students in the Fall and Winter and post-secondary students in the Spring to provide tutoring to students within their school. Due to their participation, the CDLI has been able to hire students in 10 subject areas (typically the more academic courses or courses with final exams) and make them available to students after school and during the evenings through Elluminate Live (see Figure 5.16).

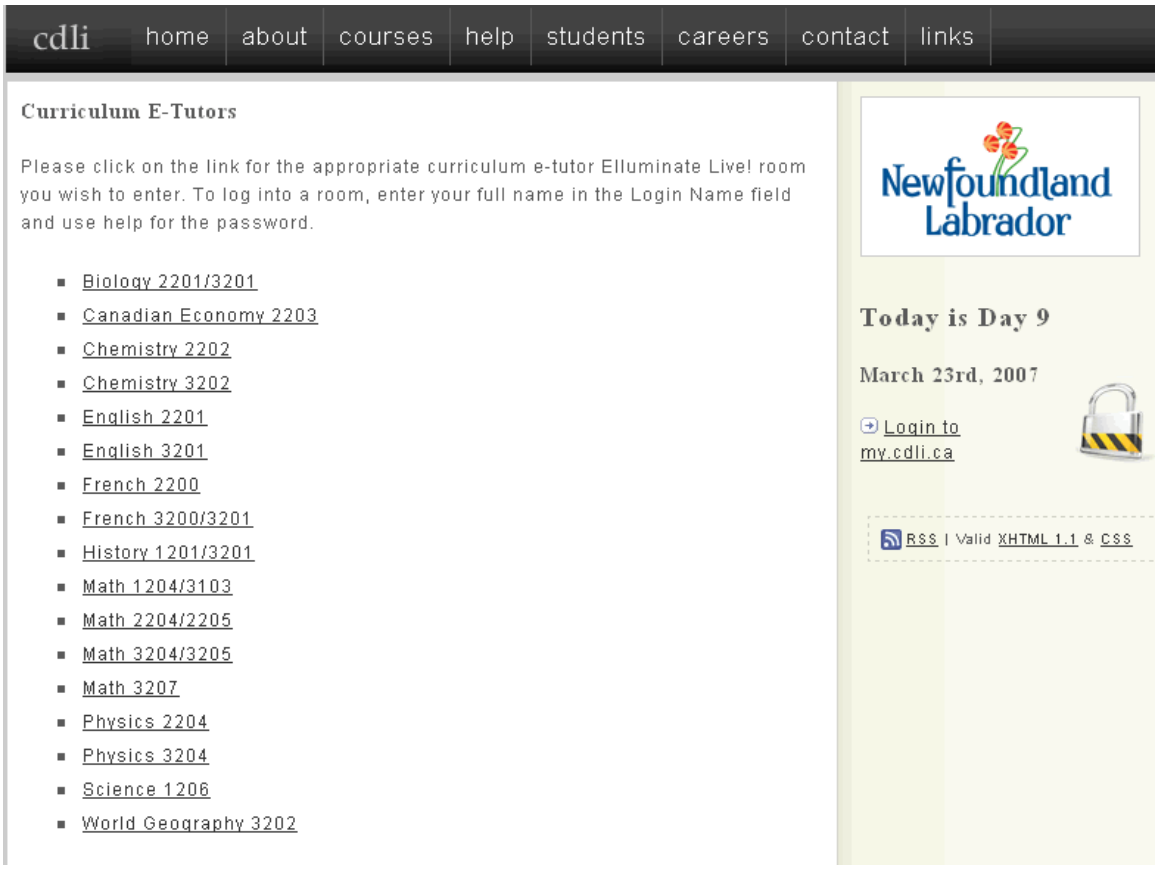

Figure 5.16. Website where students can access the e-tutors

The use of Elluminate Live does mean that students have to either be able to access the virtual classroom from home or physically remain at school or go to another location with the necessary bandwidth to access the Internet – the latter would have been the case for students at Beaches All Grade, as none of the students reported to being able to access the virtual classroom over their home Internet connection.

Another way the CDLI sought to support their students was through the creation of multimedia learning objects (MLOs). The CDLI has utilized a variety of formats since they began creating these MLOs. Initially the MLOs were created by using *Camtasia* to capture the narration and whiteboard area of a virtual classroom or to narrate an *MS PowerPoint* presentation. Other MLOs were created using the animation tools in

Macromedia Flash. Recently, the CDLI created a standard format for these MLOs which are narrated presentations that are captured using *Captivate* (see Figures 5.17 and 5.18).

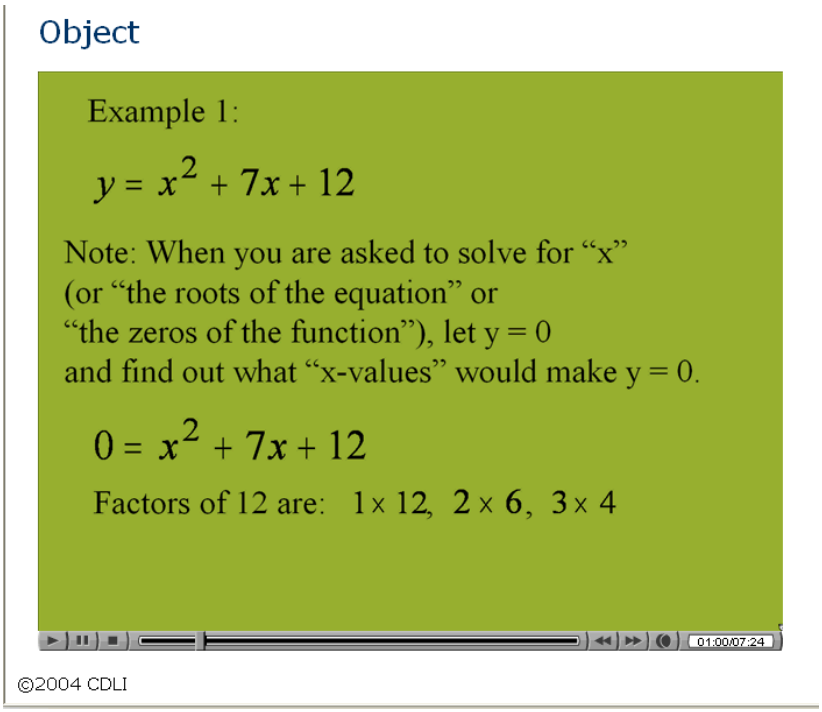

Figure 5.17. Example of an MLO from a mathematics course

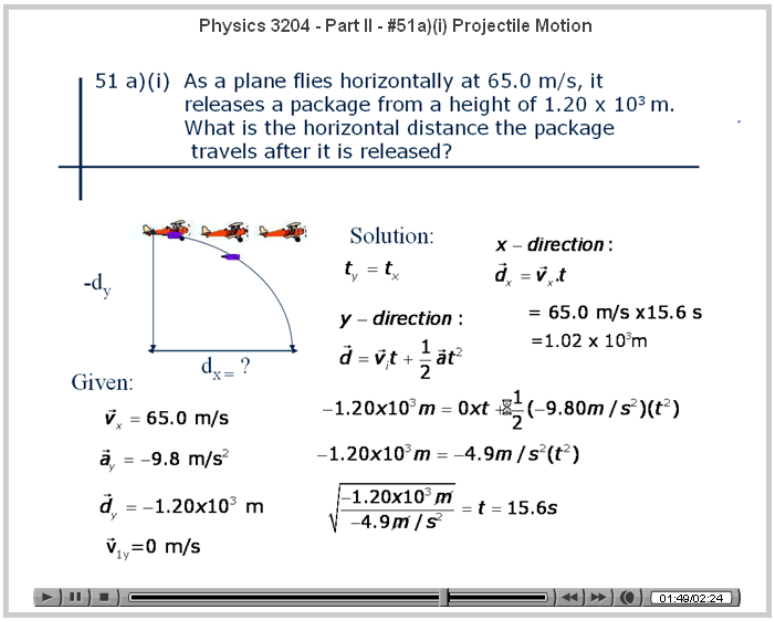

Figure 5.18. Example of an MLO from the physics exam review

At present the CDLI has over 1000 of these MLOs in 15 courses, including three courses that it has never offered – as the resources provided by the CDLI are available for use by any student, parent, or educator in the province, regardless if they, their children, or their school is participating in the CDLI.

The CDLI also created a number of co-curricular activities that students can take part in that are designed to support their instructional missions. For example, in the past the CDLI organized field trips to the French islands of St. Pierre and Miquelon, both as an instructional activity and a community building exercise for their online French as a second language students (a course that typically requires a great deal of interaction, particularly verbal, by the students). Another example available to students in the French courses was French club, which Justine (who was the only student to even mention any of these co-curricular activities) described her and Constance's participation in.

> You usually stays in for half an hour and activities like, could be like bingo or stuff like that, just to get us involved in more French, French activities.… it's more talking out loud, like because it's less people there, it could be only like, some day it could be two or three, it's not a big class, usually in class there's fifteen.… not a lot of people show up in French club.… I think the most I've seen when I went, when I went was five or six altogether, and then there's three teachers.… it's all in one big room.… you used the mic a fair bit and they put you right on the spot, like okay, answer this question, about what we did in French class in French club.… they'll ask you to say a few things on it, and they'll ask you specifically, whereas in class they might say, whoever wants to answer this

> question put up your hand or answer in the direct messaging, they really want you to talk out loud on the mic (second interview)

A third example of how the CDLI sought to support their students through co-curricular activities was their participation in the province-wide math league, where students from schools all across the province compete in mathematics competitions. Justine also mentioned that she had attended this on one occasion as well.

Beyond these three sources of support, the students also have access to the asynchronous course content in WebCT, along with the notes provided by the e-teacher (and in some cases other students) in WebCT and Elluminate Live. They have the ability to get assistance in real time from their e-teacher during synchronous classes and by e-mailing or telephone them during their asynchronous classes – and all eight students reported that their e-teachers made it a regular habit to login to Elluminate Live during their asynchronous classes simply to be available should they need help.

Given that these classes were delivered over the Internet, the students had greater access to resources available on the World-Wide Web than most classroom students (with maybe the exception of those who are a part of one-to-one computing initiatives). The students also had access to methods of support that classroom students would have access to, such as their textbooks, in-school tutoring programs, the school and/or municipal library (although in most rural areas of Newfoundland and Labrador these were amalgamated, usually in the school building), and their fellow classmates.

Finally, while this was not the intention of the CDLI, these virtual school students also had access to in-school teachers who may have had subject matter expertise in these areas or may have been responsible for teaching the course in the past. In many of the

schools that participated in the CDLI the latter was usually the case, with a teacher who probably had a background in English or social studies that had taught biology or the academic mathematics courses prior to the CDLI. However, Beaches All Grade was fortunate enough to have teachers at the high school level that had taught the courses in the past and that had subject matter expertise in English language arts, French as a second language, mathematics and science – which accounted for all of the CDLI courses that had Beaches students enrolled in with the exception of the two fine arts courses taken by Jasmine and Keith.

Sources of Support Students Did Not Use

While it was the desire of the CDLI that students would primarily make use of sources of support that they had provided, the reality was that beyond the e-teacher most students did not use many of the resources provided by the CDLI. Table 5.4 provides a summary of student usage of the various sources of content-based assistance that were available to the students. Items with a check mark (i.e., v) indicate that the student reported to using that source of support when asked during that interview. Items with an x indicate that the student reported that they did not use that source of support during that interview. Items that are left blank were not mentioned during that interview by the student or I simply failed to ask the student about that source. For example, Jasmine's e-teacher did not record their synchronous classes in Elluminate Live so there was no need to ask her about her use of the Elluminate Live recordings.

Table 5.4. Sources of content-based assistance (that the students used – v, did not use – x, or did not mention or were not asked about – blank)

Student	Interview	Elluminate Live recordings	Course content in WebCT	E-Tutors	Multimedia learning objects	World-Wide Web	Notes	Textbooks	Classmates	E-Teacher	In-school teachers
Jasmine	1		v	x	x	x			x	v	x
	2		v	x			x		x	v	x
	3		v						x	v	
	4		v						x	v	x
Max	1			x	x		v	x	v	v	
	2		v	x	x	x		x	v	v	x
	3	x	v	x	x	v	v	v	v	v	v
	4	x	v	x	x		v	x	v	v	
Kathy	1	v	v	x	x	v		v	v	v	v
	2	v	x	x	x	v			v	v	v
	3	v	v		x	v	v		v	v	
	4	v	x	x	x	v	v	v		v	
Mya	1	x	v	x	x	v				v	v
	2	x	v	x	x		v		v	v	v
	3		x	x	x	v	v		v	v	x
	4	x	x	x	x	v	v		v	v	x
Peter	1	v	x	x	x		v		v	v	v
	2	x	x	x	x	x	v		v	v	v
	4	x	x	x	v	x	v	x	v	v	v
JD	1	x	v	x	x		v	v	v	v	v
	2	x	x	x	x	v	x	v	v	v	v
	3	v	x	x	x				v	v	v
	4	x	x	x	x	v	v		v	v	v
Connie	1	v	x	x	x	v	v	x	v	v	v
	2	x	x	x	x	v		v	v	v	v
	3	x	x	x	x	x	v		v	v	v
	4	x	x	x	x	v		v	v	v	v
Justine	1		x		x	x	x	x	v	v	v
	2	v	v	x	x				v	v	v
	3	x	x	x	x		v	v	v	v	v
	4	x	x	x	x	x	v		v	v	v

As it is illustrated in Table 5.4, the sources of support they used the most were their in-school classmates, their e-teacher, and their in-school teachers. Students rarely or sporadically used the Elluminate Live recordings, the course content in WebCT, the e-tutors, the MLOs, the World-Wide Web, their own notes, and their textbooks. For example, the two students whose e-teacher made use of the asynchronous course content (i.e., Jasmine and Kathy) made regular use of that resource. While four of the remaining six students (i.e., Peter, JD, Constance, and Justine) indicated that they used the course content in WebCT, it was during a single interview and, in many instances, in that same interview or one of the following interviews the student would later contradict themselves and state that they did not use them. For example, in JD's first interview when asked, "do you ever go back and check the lessons that you find in WebCT to see if you could find the answer?", he responded, "Yeah, sometimes." However, in his third interview, when I asked him what parts of that course content he found useful, he responded, "Oh, I've never, I've never checked it out." Because he had indicated in an earlier interview that he had used him, I asked a follow-up question, "You've never gone in and used them at all?" to which he replied, "Nope."

Max was the only student whose teacher did not utilize the course content that reported using it on a consistent basis when asked "Have you gone in and looked through the lessons in WebCT trying to find an answer to a question?" He was also the only student out of this group of eight who did not have access to a home computer, and one of three students who had taken a one semester mathematics course during the first term and who were left with a free period during the second term which they would spend in

the distance education room (the other two students were Kathy and Mya – both of whom reported to using the course content in WebCT more than the others).

For the most part, students also did not make use of the recorded virtual classes that were available to them through Elluminate Live – with the exception of Kathy, who made extensive use of that resource. Only one student (Peter) reported using the MLOs – in fact none of the students even knew what the MLOs were during my first interview with them. While Peter did report to using the MLOs on one occasion, his experiences with them was less than favorable. During his final interview he was asked of the various resources which one had been the least useful. Peter's response was:

> Probably the MLOs, I think I only got on it once and I couldn't make no sense in it, and we're not, like no one tells us how to do it, it's just like, it's there, use it if you wants to use it kind of thing.

Not a single student indicated that they had accessed the e-tutors that the CDLI provided after school and during the evenings. Constance did report to using or trying to use an e-tutor for her language arts course the previous year, "I'm not sure if we used her once or twice or not, I can't remember, I know we tried, (laughs) but I don't know if we got in one day or not, we were going to, but I don't think that we did." Even if she was successful in accessing the e-tutor, it obviously did not make enough of an impression of her to encourage her to want to us them again this year (or even for her to accurately remember if she was successful).

A final source of support that the students did not access on a regular basis was their textbook. Some of the students in the science and mathematics courses (i.e., Max and JD) indicated that they used their textbooks to find formulas or sample problems,

while some of the students in the language arts courses (i.e., Constance, Kathy, and Justine) reported that they used their textbooks for vocabulary or because they were assigned questions or activities from the textbook. When asked why they relied so little upon their textbooks, Justine replied rather directly "it's because our teacher don't [*sic*] use it."

One tool the students in the language arts courses did use when they needed content-based assistance was the Internet. However, like the language arts students who reported to using their textbooks, they used the Internet because their teacher had specifically recommended it. For example, Mya indicated that her e-teacher would "give you websites… or keywords to type into Google to get like accurate results." Two students (i.e., Peter and JD) also reported during their final interview that they had also used one of the in-school tutors that were available to them.

Regardless of these isolated or more selective student uses, there were three main sources of support that students turned to for assistance on a regular basis: their e-teacher, their in-school classmates, and their in-school teachers.

In-School Classmates

As discussed earlier, students relied on each other for a great deal of assistance. In fact, during the final interviews when they were asked what source of assistance they found the most helpful over the past year, six of the eights students referenced their in-school classmates. During their synchronous class time, students indicated that convenience was one of the reasons why turned to each other. "I usually asks [*sic*] the students first, instead of typing it into the teacher" (Kathy). "It's more convenient, they can come over and actually show ya [*sic*], like work out a problem or whatever for like

physics and math…. And they can actually do it on paper" (Justine). While Justine referenced convenience, the example she used from one of her synchronous classes also spoke of the usefulness of having someone physically available to them to work through a sample problem. In addition to the convenience and the ability to see or physically interact with them, students also relied upon their in-school classmates because they were perceived to be able to speak to them at their own level. "You can always ask them [the other students] to explain, because the students may explain it better" (JD). This was a sentiment expressed by three other students.

During their asynchronous class time, students reported that their ability to collaborate with each other was one of the main reasons they utilized their classmates for assistance. For example, as Peter described, "[we] helps [*sic*] each other and, like, we works [*sic*] on the same problem just like, you know, and if either one of us got like a problem, we just asks [*sic*] and, you know, just helps [*sic*] each other along." This was re-enforced by Max, who stated:

> We all are working on our questions by ourselves and then, ah, ah, we figure it out and say everybody, everybody got the question done or whatever and if we got the same answer, we say alright then go on, but if we don't we'll get to together and figure out who went wrong where or whatever.

Another student who was in that same science and mathematics class, Justine, also said, "usually I ask just a girl in my class, a girl or a guy in my class, whatever, and if they are unsure because usually we're working together on whatever we do." Instances of students' assisting their peers were not limited to the students in the science and mathematics courses. Mya described that in one of her asynchronous language arts

classes, "we had a Macbeth assignment due last week when she [Dayna][18] was gone, so I printed off my answers and I was trying to explain to her what the questions meant."

Rovai (2002) described the kind of communities that form in classrooms as " a social community of learners who share knowledge, values, and goals" (p. 322), while Wenger (1996) stated that the learning that occurs in communities of practice are fundamentally social in nature. This may explain why the students found their in-school classmates so useful. Vygotsky (1978) described that one of the differences between adult and adolescent learners was that for adolescents learning was a social process with "adult guidance or in collaboration with more capable peers" (p. 86). For the students at Beaches, their classmates were their more capable peers. Their interaction and collaboration during synchronous and asynchronous class time, along with sessions outside of school, were the social process that they required to keep themselves within their zone of proximal development – provided that they were able to stay on-task.

CDLI E-Teachers

The students' use of their e-teacher was dependent upon a number of factors. For example, if it was a synchronous class and a student wasn't able to get a response from their classmates, all eight students indicated they would simply ask their e-teacher. "If we got an online class I would just go and ask the teacher" (Peter). However, if the students were in an asynchronous class their patterns were a little more varied. All of the students indicated that they had e-mailed their e-teacher using the WebCT mail function. "[I'd] just e-mail me [*sic*] teacher and asks [*sic*] him about whatever I'm having trouble with" (Jasmine). None of the students used a personal e-mail account, such as Hotmail or

[18] See Appendix Q for a description of Dayna and the other three participants who were excluded from the analysis for this dissertation study.

GMail, but always used the internal WebCT mail. Some students had e-teachers who made a habit of logging into Elluminate Live during their asynchronous classes in case the students had any questions. "Usually our teacher gets off, like stays online in case we has [*sic*] any questions, he's around" (Constance). Students in one of the language arts classes (e.g., Constance, JD, and Justine), along with students in one of the science courses (e.g., Max, Peter, and Justine) mentioned that their e-teacher were usually in the virtual classroom during asynchronous class time.

Five of the students mentioned that they could call their e-teacher. "Every now and then we call him if we has [sic] any questions" (Max). What was interesting about this method of contacting their e-teacher was that when asked how often the students actually called their e-teacher all but one student indicated that it had only been once or twice all year long. The one exception, Max, reported that they had called their e-teacher "two or three times this year."

The decision of how to contact their e-teacher, like many other aspects of their virtual school experience, was usually based on external factors. It seemed when the students had ample amounts of time to receive a response to their query, they selected the WebCT e-mail, as illustrated in this example from Mya:

> I wrote him from home and I got a response the next day in class, at the beginning of class…. I went in and checked my mail on CDLI and it came back with the answers, whenever I have a problem, like, whether its about an assignment, er if I'm at home or at school…. if I have an offline class its harder to get a hold of him and without waiting a whole day to get an e-mail back or whatever.

Three students indicated that if there were able to continue working without the information included in their query they e-mailed their e-teacher. However, if the information they needed prevented them from continuing their work, they would call their e-teacher. For example, Kathy said of her science course, "if I'm really stuck, then I call the teacher."

While their inability to work past a certain point in their asynchronous class work was one of the reasons given for how they contacted their e-teacher, the most common rationale was a deadline. As Constance described:

> I find that e-mailing depends on when your assignment is due, like, you might, if you like e-mail him a question, then you mightn't get it back for a day or two, though he's usually pretty good with that, he usually always checks it in case he do, but just say, I don't know, for example he don't for some reason and our assignment the next day, we can't get a hold of him, but like, he encourages us if we can't get a hold of him through e-mail to call, so we always, shouldn't have too big a problem if we really, really needs to get a hold of him anyway.

If the students ran into difficulties but had enough time to wait for a response, they e-mailed their e-teacher. However, if there was an impending deadline (and possibly because of their poor use of their asynchronous class time), they called or tried to catch the e-teacher in Elluminate Live. Further, CDLI e-teachers were very responsive. As illustrated with Mya's example earlier, she e-mailed her e-teacher from home after school one day and received a response when she went to class the following day. In fact, all eight students indicated that 24 hours, or the next day, was a typical response time.

A third reason that affected how students sought assistance that was given by students in one of the science and in the mathematics courses was the nature of the work. As Justine described it:

> French is not a lot of steps and understanding, well there is understanding, but there's not a lot of steps and stuff and I think he, we, it's not too many questions we have outside of class for assignments and stuff…. Like for physics and math it's, it's, it's steps and processes and stuff like that, whereas French, this is it and if you don't know that, well, and usually it is easy to understand in class and stuff.

The nature of the task or work was the rationale that four students in these courses gave for turning to their in-school science or mathematics teacher, instead of their e-teacher.

In-School Teachers

The students at Beaches All Grade were fortunate, in that with the exception of the two fine arts courses being offered through the CDLI, there were content-based teachers at the school for all of the other virtual school courses. The reason that students had to take physics or French online was not because there was not a physics or French teacher in the school, but because of the small number of students who expressed an interest in these specific courses. Students had access to an in-school teacher who had subject area expertise in their virtual school courses that they could turn to for assistance.

With the exception of students who were in a course by themselves (i.e., Jasmine and Kathy), all of the students indicated that they would turn to their in-school teachers for content-based assistance. In Jasmine's case, she was one of the students enrolled in a fine arts course and there was no teacher on staff at Beaches with a background in this area. In Kathy's case, while she reported going to the in-school language arts teacher

from time to time for assistance (a course in which she was enrolled with five other students), in the science course where she was the only student, her only human resource was her e-teacher. These cases do not provide data about whether these two students went to their online teacher because they were in a class of one at their school (i.e., because they were the only student they felt a greater connection to their own resources) or if there were other factors involved, such as Jasmine's inability to seek out an in-school teacher with that specific subject matter expertise.

The frequency and the amount of time that students spent with their in-school teachers varied; students in the two science courses reported visiting more frequently and for longer times than other students (see Table 5.5 for a summary).

Table 5.5. Number of times and amount of time the students reported to seeking assistance from in-school teachers

Student	First interview	Second interview	Third interview	Fourth interview
	Sep to Feb	Feb to Mar	Mar to Apr	Apr to May
Constance	1-2 times	1 time (a few minutes)	0 times	1 time (2 or 3 minutes)
Peter	5-6 times (a couple of minutes)	3-4 times	N/A	0 times
Justine	2-3 times (probably 20 minutes at most)	10 times (10 minutes… it could be like 15 or 20)	1-2 times (usually 5, 10 minutes)	5 times (5 minutes)
Kathy	2 times	1 time (5 minutes)	0 times	0 times
Mya	1 time	0 times	0 times	2 times
Max	5-6 times	0 times	2-3 times (only like a minute or so)	1-2 times
JD	1-2 times	1 time (5 or 10 minutes)	1 time	0 times

During the student interviews, students reported that they sought out their in-school teachers between 46 and 54 times from the beginning of the school year until

approximately the end of May. During these visits, the students reported that they would spend an average of seven minutes each time they sought content-based assistance. Over the course of the school year, the three teachers that students indicated as resources would have spent approximately five and a half to six and a quarter hours providing assistance. This is an average of two hours per teacher.

This was not the same perception provided by two of the teachers that the students' identified as turning to for help. In my interview with Mr. Dan Edwards in late May, he indicated that throughout the year the students had come to him for assistance in mathematics twice and in French two or three times, and that he had spent "just minutes, probably be at the door, how do you say, okay, say whatever and it's gone… no sitting down for twenty minutes or spending the afternoon after school." The science teacher (i.e., Mr. Browning), who I also interviewed in late May, indicated that the students would come to him "once or twice a month" for "maybe five to ten minutes per time." I was not able to interview Ms. Eleanor Matthews, the third teacher that the students mentioned. Based on the two teachers I was able to interview on this matter, Mr. Edwards indicated that he assisted the students four to five times and Mr. Browning ten to twenty. Even if we assumed that Ms. Matthews spent as much time as Mr. Browning, this would still only equal a total of 24 to 45 times that the students had come seeking assistance (and keep in mind that the teachers who responded were counting all twelve CDLI students, not just the eight that are the focus of this chapter).

This was not the only area where the virtual school students and in-school teachers differed in their reports of the information. The description of these incidents

from the students' perspective was largely focused upon what the problem was and what their in-school teacher suggested to them. For example,

> Physics assignment last week, I asked, umm, Max or Norah… And, and they didn't know the answer so I went to Mr. Browning… Our science teacher… He said, it was on generators… And he told me that, he said that in our book, he said on, well, whatever the page was he said, cause he teaches physics, and he told me that, umm, it explained about generators in the book and he just gave me a little hint, like he said, umm, vertical and then he said something about the rule for vertical and he said, well, it's in our book, explained better, so he told me to go to my book. (Justine)

Conversely, the teachers' interviews focused on the decisions made by the students in terms of when to come for assistance and where they had sought help prior to coming to their in-school teacher. During my interview with Mr. Browning, he referred to the same incident that Justine described.

> …last time I remember they came was like half way through the, through a period and they were doing a lab then that they, for the third time, that they were, were supposed to do maybe in October, and they're doing it for the third time, half way through a period, couldn't get it to work, didn't know what was wrong with it, so… well, have you read these sections in the book yet, no, well, why not, well, we don't use the book, they don't look at the book, well, I'll say, I'll flick open the book and say, now take this section right here, read from page four seventeen to four twenty-two, done (Gerry Browning)

While all of the in-school teachers, including Mr. Browning, appeared willing to provide assistance when asked, some teachers expressed frustration with both the students and the e-teachers. In this instance, Mr. Browning was upset that the students had come during the middle of a period and interrupted the class that he was teaching instead of waiting until the class had ended. He was also frustrated by the fact that the students had come to him without first checking in their textbook or in any other material that they had available to them, an action the teacher felt was due partly to the lack of preparation by the students and partly because their online teacher had not made it apparent that the textbook or the course content in WebCT could be a specific resource for this lab.

> This was consistent with comments that Mr. Edwards made during his interview: One thing I find though is that they come though, probably the day that it has to be faxed [i.e., the day it is due]… what they are looking for is basically for you to try and do the answer for them and what I do is, what I try to do is get a textbook and show them an example that's already done in the textbook and get them to model that, I try to avoid doing it for them.

These sentiments expressed by these two teachers was consistent with the students own scores on the ESPRI. Of the four factors that were measured, the students two highest mean scores were on the Responsibility/Risk Taking ($\mu = 3.83$) and the Organization and Self-Regulation ($\mu = 3.06$). Roblyer (2005) described Organization and Self-Regulation as:

> Successful online students are able to organize their time and regulate their own learning in the relatively unstructured environments of online courses. Although virtual teachers frequently build in checks and prompts to remind and encourage

> students to keep up with course tasks, students who do best are already organized and motivated that they need fewer or no such prompts. (¶ 8)

Roblyer and Marshall (2002-2003) stated that Responsibility/Risk Taking focused on the student "taking responsibility for one's actions and taking individual initiative…. students frequently have to take the initiative and complete tasks, even when all the information may not be given and the correct way to proceed may not be clear" (p. 250).

While Roblyer and Marshall (2002-2003) stated the purpose of this instrument was "for predicting success of high school students in distance environments" (p. 252), in this instance it appeared to have accurately predicted that these students were going to have some difficulties with organizing their time, regulating their own learning (e.g., during their asynchronous classes), and taking responsibility to exhaust personal resources (e.g., their own notes and their textbook) before relying upon their in-school teachers for help. These difficulties were reflected in the observations that their in-school teachers made of the students' independent work habits. Even with these perceptions, all of the in-school teachers felt that there was some level of responsibility to assist these students. This was best evidenced when the school principal, Mr. Mitch McDonald, stated, "with everybody's help, that's the only way it can work, everybody's got to be aware that these students are a part of the school and the CDLI is part of the school, it's not something separate from the school." This was a general sentiment shared by all of the teachers I spoke with at the school, while providing content-based assistance to these students may not be part of their job these students are still a part of the school, still their students.

Evening Sessions

A source of support that I discovered as being very valuable to the students, at least the students in one of the two mathematics courses (i.e., Justine, Peter, JD, and Norah) and one of the two science courses (i.e., Justine, Peter, Max, and Norah) were evening work sessions that they would have on a frequent basis at one of the students' homes. Given the sense of community that exists between these virtual school students, it shouldn't have been surprising that their community would extend beyond the confines of the school walls. The specific purposes of these sessions, based upon responses from all four students (i.e., Justine, Peter, JD, and Max), usually focused on an up-coming assignment or test and were typically held shortly before the due date. According to Max, these evening sessions first came about because their science course was "a harder course or something… and there's only four of us right, so it's no big deal for us all to get together." This was consistent with the rationale provided by Justine:

> I guess we were all kind of new with the online courses and stuff, and real uneasy studying by ourselves, so we all suggested, well why don't we all together for our assignments and stuff and help each other, so we just decided to, at the beginning.

Even though this was the fifth year Beaches had participated it in the CDLI, and the seventeenth year in distance education, this was the first time these types of groups had formed and met on a consistent basis.

> In terms of the logistics of these sessions, Justine attempted to describe the scene: we always get together around a kitchen table, ahh, at somebody's house and there's papers everywhere and books everywhere and we're just kind of like, all around a circle and going through our assignment or whatever together…. we got

> everything sprawled out, papers everywhere and stuff like that, and, umm, that's about, about it, us talking about physics and math or whatever we're doing, sometimes we might have a little break and get a lunch or whatever, but usually always sitting around a table and doing it that way.

This was consistent with the briefer descriptions provided by the three male students. In a similar fashion to how they complete their work during their asynchronous classes, students worked in a collaborative manner. Peter indicated,

> if we got an assignment to do or whatever, we just gets together and helps each other and, like, we works on the same problem just like, you know, and if either one of us got like a problem, we just asks [*sic*] and, you know, just helps [*sic*] each other along.

This was also consistent with how all of the others described the work process, as opposed to a division of labor effort where one student would complete question one, another question two, and then they copy each other's answers (which I did ask all of the students about on many occasions). For these students, their method of working together was truly a collaborative effort where everyone completed question one, then they compared answers to make sure everyone got it right and move on to the next question. If anyone had a different answer, they would figure out who had the correct responses, then provide assistance to the student(s) who got the different answer, and wait until they had figured out where they went wrong before they moved on.

In addition to these general descriptions, the students also described specific characteristics of these sessions, such as their frequency, length, and the percentage of time their conversation was about the task at hand (see Table 5.6).

Table 5.6. Characteristics of the evening sessions reported by the students

Characteristic	JD	Max	Peter	Justine	*Mean*
Frequency	1-2 times a month	1-2 times a month	4-6 times a month	2-3 times a month	*1-2 times per month*
Length	3-4 hours	couple of hours	4-5 hours	4-5 hours	*3.5 hours*
Percentage of conversation about the task	50%	40%	60%	35%	*45%*

The students indicated that they met 1-2 times a month (note that Justine and Peter were both in two courses that had these sessions). When they got together, they would spend an average of three and a half hours together. During that time, a little less than half of the conversation was about the task (usually an assignment) at hand.

It is interesting that both of the courses for which these sessions occurred were scheduled as 60% synchronous and 40% asynchronous. Over a fourteen day timetable or approximately a three week period, these students would have six one-hour synchronous classes and four one-hour asynchronous classes. In any given month, depending on their individual schedules and exactly which classes were scheduled as synchronous and which asynchronous, students would have five to seven hours of asynchronous class time. In Table 5.6, the students reported that the only spent an average of 55% of this time focused on the task at hand. However, these same students in an unsupervised environment sitting around a table working, would spend four to seven hours a month outside of school, focused on their work 45% of the time. These evening sessions are interesting because the approximately two and a half hours the students spent focused on their work during these sessions is almost exactly the amount of time they are engaged in other activities during their asynchronous classes.

There were numerous examples illustrating that the CDLI students at Beaches All Grade exhibited characteristics of a learning community. Renninger and Shumar (2002)

defined a learning community as "a group of people who interact with each other, learning from each others' work, and provide knowledge and information resources to the group related to certain agreed-upon topics of shared interest" (p 96). Students enrolled in these mathematics and science courses met during evenings, engaged in on-task conversation during synchronous class time, and worked collaboratively during asynchronous class time. Further, consistent with common definitions of a learning community (Renshaw, 2003; Schrum, Burbank, Engle, Chambers, & Glassett, 2005), it was formed because these students had a common purpose of having to complete their CDLI class work and assignments rather than because it was encouraged by their e-teacher or one of their in-school teachers.

Chapter Summary

The purpose of this study was to examine the nature of web-based learning in Newfoundland and Labrador secondary education. Specifically, this study examined how students interacted with their web-based courses and the process they undertook when they needed help. In this chapter, I presented and discussed the findings organized by my three research questions.

First, most of their instruction occurred during synchronous CDLI course meetings. Due to the need to focus on the content, students were largely on-task during their synchronous class time. While the students chose to use text-based communication over talking to their e-teacher and online classmates, they talked to their in-school classmates – usually to ask their colleagues for clarification of something presented during their synchronous class.

Second, I discussed how e-teachers usually assigned seat work or provided time to work on assignments during the asynchronous class time. This routine, and largely unchallenging, work was usually completed by the students on their own time (including during evening gatherings for that very purpose) and the asynchronous class time was used as free time. When students decided to use asynchronous class time to complete on-task activities they tended to work in a collaborative manner, although this was usually brought on by an up-coming deadline or some other external source of motivation.

Finally, when the students needed content-based assistance they usually turned to their in-school classmates first. As students in a rural school, these students already possessed a strong sense of community. However, the even smaller local class size in their virtual school courses meant they relied upon each other as more capable peers most of the time. When the members of this learning community were unable to help, students would turn to their e-teacher during synchronous class time. During asynchronous class time if students had time to wait for a response they also turned to their e-teacher, but if there was a deadline approaching they turned to their in-school teachers (if there was one available with the perceived subject matter expertise). Students rarely used the additional human and technological resources provided by the CDLI for content-based assistance.

Chapter 6: Conclusions and Implications

The purpose of this study was to examine the nature of virtual schooling in Newfoundland and Labrador secondary education. Specifically, this study examined how students interacted with their web-based courses and the process they undertook when they needed help. In Chapter Five, I presented the themes addressing my three research questions:

1. What are the students' experiences during their synchronous time online?
2. What are the students' experiences during their asynchronous time online?
3. When students require content-based assistance, where do they seek that assistance and why do they choose those sources?

In this final chapter, I provide a summary of the themes discussed in Chapter Five (see Table 6.1) and frame these themes within the literature related to the operation of other virtual schools. Next, I offer recommendations for the practice of virtual schooling as delivered by the Centre for Distance Learning and Innovation (CDLI). I conclude with a discussion of potential implications for future research arising from the findings of this study.

Table 6.1. Summary of results by research question

Research Question	Theme	Pattern
Students' synchronous experience	Majority of the instruction occurred	Students primarily stayed on-task
		Students relied upon each other for assistance before asking their e-teacher
	Students could be off-task	Depending on in-school or out-of-school activities, among of off-task conversation could increase dramatically
		Without supervision, one students could be responsible for paying attention while the other students did not
	Students prefer to interact using direct messaging	In the virtual classroom, students would ask and answer questions primarily using the direct messaging
		If the question needed an explanation or if the e-teacher required it, students would use the microphone
Students' asynchronous experience	Little instruction occurred	Students were assigned practice questions or time to work on assignments
		Students tended not to work during this time
	Students were primarily off-task	Students spent most of this time talking to each other or playing on the Internet
		If the students worked it was usually due to the motivation of an impending deadline or up-coming test
	When students did work they worked in a collaborative fashion	All students would complete a question, they compare answers to make sure everyone was on the right track
		Student felt that their CDLI course workload was greater than their classroom-based course workload

Research Question	Theme	Pattern
Students' process for seeking content-based assistance	Students did not use sources of support provided by the CDLI	Students did not know what the MLOs were
		Students knew of, but never used the e-tutors
		Students did not use the asynchronous course content because their e-teachers did not make use of it
	Students primarily relied upon each other for support	During synchronous class time students would ask each other questions, rather than interrupt their e-teacher
		During asynchronous class time students would work together
		Students in one of the mathematics ad one of the science courses would meet regularly during the evening to work on assignments and prepare for tests
	Students used their e-teacher	During synchronous class time if their in-school classmates did not know the answer
		During asynchronous class time if there was enough time before the work was due to receive a response or if they could move on in their work without the information in question
	Students used their in-school teachers	In subjects where there was an in-school teacher with that expertise the students used them for content-based assistance
		Students would typically turn to their in-school teachers for help immediately before a deadline
		Students perceived to rely on their in-school teachers more than their in-school teachers reported

Situating the Results

As was discussed in Chapter Five, the majority of the instruction of the CDLI students at Beaches All Grade occurred during their synchronous class time. Although students were often assigned seat work or provided time to work on assignments during asynchronous class time, students appeared to rarely use this time to complete CDLI work. Instead, as indicated in observations and interviews, the students used this time to

talk to friends, explore the Internet, or engage in other off-task behavior. When the students at Beaches needed content-based assistance they relied upon their local classmates. If this was not successful in solving their difficulty, they turned to their e-teacher if it was during synchronous class time or if they had the time to wait for a response. If it was during asynchronous class time or if they needed more immediate assistance, they would seek out their in-school teachers. Students rarely or never used the sources of support provided by the CDLI.

Students' synchronous experience

As was described in Chapter Four, the synchronous instructional component of the CDLI is one of the things that made it different from other virtual schools in North America. Almost all virtual schools in the United States, and even the majority of Canadian ones, based their instructional delivery solely on an asynchronous model. However, as was discussed in Chapter Five, synchronous instruction is also an area that the CDLI plans to decrease in the coming years. Prior to the virtual school movement there were many examples of distance education program that utilized synchronous instruction. Clark (2007) described the use of synchronous distance education programs based upon educational television and later two-ways video in Iowa dating back to the 1930s. Howley and Harmon (2000) reported that 40% of K-12 unit schools in the United States utilized some form of synchronous video-based distance education. Audiographics or telematics systems that were used extensively in the 1980s and 1990s in countries such as Canada and Australia also relied heavily on synchronous instruction (e.g., Brown et al., 2000; Oliver & Reeves, 1994).

In addition to the low usage of synchronous instruction in the practice of contemporary virtual schooling, there is also a lack of literature on the use of synchronous instruction in virtual schools. Murphy and Coffin (2003), along with Nippard (2005), represent most of the literature in this area. Murphy and Coffin (2003) studied how the use of synchronous instruction in a virtual school French course allowed for collaborative, individual instruction, oral practice, and intimacy. Nippard (2005) examined the levels of social presence and the ways that social presence was manifested during synchronous instruction. Both of these studies were based on the practice of synchronous instruction with the CDLI. One of the obvious reasons for the lack of literature in this area is the lack of available virtual schools that actually use synchronous instruction as a part of their delivery model.

The use of synchronous instruction by the CDLI is consistent with the theory of equivalency proposed by Simonson, Schlosser and Hanson (1999). The authors proposed that the design and delivery of distance education should provide learning experiences that are equivalent to experiences students would receive in the traditional classroom. Some have questioned the worthiness of the label "theory" for Simonson et al.'s equivalency model, as opposed to something more of the nature of a heuristic or a design principle, and other researchers have cast doubt on its validity (Bernard, Abrami, Borokhovski, Wade, & Lou, 2004). Nonetheless, the theory of equivalency is often discussed with the other theories of distance education (Saba, 2003). However, even with the overall lack of synchronous instruction in the practice of and literature on virtual schooling, recent calls for research on virtual schooling have not included synchronous instruction as an area where future research is needed at the K-12 level. This makes the

results of this study, with regards to the nature of synchronous instruction by the CDLI and the students' experiences during those synchronous class times, somewhat unique in the literature on virtual schooling.

Students' asynchronous experience

The CDLI e-teachers use of asynchronous instructional strategies was limited due to the reliance on synchronous instruction. The irony is that unlike the lack of literature on synchronous instruction in virtual schooling, there is a growing literature on asynchronous teaching strategies. However, this literature is dominated by descriptive accounts written by those engaged in the practice of virtual schooling, (Elbaum, McIntyre, & Smith, 2002; Friend & Johnston, 2005; Johnston, 2004; Morris, 2002; Pape et al., 2005; Pape, 2003; Zucker & Kozma, 2003) rather than intensive studies of synchronous instruction by external or collaborating researchers. Even though this literature has been limited to only these kinds of personal reflections by teachers and administrators describing what they do at their virtual school, the reports may still offer useful strategies for CDLI e-teachers. Many of the strategies discussed by these practitioners were described in Chapter Five as examples I observed e-teachers utilize (see Figures 5.5-5.13). The problem was that these observed examples were used in isolated incidents or only by a small number of e-teachers.

As Cavanaugh (2007) suggested, research was "needed to inform instructors about the most effective interaction types, tools, and frequency for the learners and tasks in a course" (p. 161). Earlier, Cavanaugh also called for research that would "enable course designers to supplement auditory and performance-based courses with the appropriate media, synchronous tools, and offline material" (p. 160). This was consistent

with Hill, Wiley, Nelson and Han (2004), who called for an exploration "to uncover those best practices relative to specific conditions, learning goals, contexts, and learners" (p. 453). The implication of these calls is that some learning objectives may be more suited to synchronous or asynchronous instructional strategies. This research would require a shift in the administrative thinking at the CDLI, as it would require e-teachers to determine which topics needed to be covered during synchronous class time and which content and by what method should be covered during asynchronous class time – as opposed to simply scheduling synchronous and asynchronous classes based on an arbitrary determination. While this study did not address either of these visions for future research, the findings related to the students' largely off-task experiences during their asynchronous class time underscores the need for this line of inquiry to ensure that future CDLI students are more engaged and on-task during this portion of their virtual school experience.

Students' process for seeking content-based assistance

While most virtual schools provide a variety of resources to support the learning of their students, there has been very little research into the academic support systems utilized by these virtual schools or how their students interact with those various sources. Even the literature that focuses upon personal accounts of those engaged in different roles with virtual schooling does not describe sources of academic support. This non-research based literature describes academic support, instructional support, or student support in terms of the role of the online teacher (Horn, PytlikZillig, Bruning, & Kauffman, 2003; Johnston, 2004); the functions available in the course management system (Ansorge & Bendus, 2003; Samal & Gopal, 2003); scheduling, registration, grading, and other

administrative systems (Morris, 2002; Pape et al., 2005); guidance and counseling services (Friend & Johnston, 2005; Pape et al., 2005); and technical support (Elbaum et al., 2002; Morris, 2002).

Even recent calls for research on virtual schooling have only referenced academic support systems in a tangential way, for example Rice (2006) called for investigations into "the relationship between student supports and at-risk student needs (p. 442), while Cavanaugh (2007) stated that "research should focus on the optimal combination of student needs, course structure, and support services" (p. 159). One of the reasons more research is needed in this area may be due to the differences in cognitive development between adult and adolescent learners. Smith, Clark and Blomeyer (2005) suggested that adolescents required more scaffolding in their online environments because they lacked the necessary experiences to be successful in this largely independent environment. The findings related to how the students navigated the process of seeking content-based assistance or academic support presented in this study represent a unique view of student support services in the virtual schooling literature. Whereas the CDLI has apparently assumed that if they provide online support, the students will use it, the students themselves prefer to use resources that are more immediate and more tailored to the unique nature of their needs at a specific time.

Implications for Practitioners

Grant (2002) reminds us that "as with all qualitative research, the extent to which the results can be applied in other contexts is situated with the reader" (p. 156). As a case study, the results are specific to the individual case and typically are not generalized beyond the case (Bassey, 1999; Stake, 1995). My goal with this study was to gain a better

understanding of and provide empirically-based suggestions for the improvement of the synchronous and asynchronous instructional practices of the CDLI through the eyes of a group of rural school students. The results of this study indicated that there were three main areas of CDLI instructional practices that need to be addressed, at least to improve the experiences of the students at Beaches All Grade. The first is the need to provide better instruction during asynchronous class time. If the students had more engaging and challenging asynchronous activities, there is the possibility that they would have used this time for more on-task behaviors. Second, CDLI e-teachers need to devise strategies that allow students to get to know their online classmates better in an attempt to develop a sense of community online. Finally, there is a need for students to know of and understand when and how to use all of the various sources of academic support that are made available to them by the CDLI.

Asynchronous Teaching Strategies

> "There are fundamental differences between being an effective traditional classroom teacher and an effective online teacher" (Davis, 2003, p. 81).
>
> "In other words, they were demonstrated as being powerful classroom teachers, our assumption was that the key factors that make you effective in the classroom are transferable to an e-learning environment" (M. Barry, personal communication, May 19, 2006).

These quotations present opposing views of the portability of classroom teaching skills into a virtual school environment. The first view is based upon the Michigan Virtual High School (MVHS), which requires its teachers to complete a full day face-to-face workshop followed by an online training program that lasts six to seven weeks and requires that

teachers spend five to seven hours per week online (Davis, 2003). The Virtual High School (VHS) has a similar online professional development program that all of their teachers must complete (Hinson & Bordelon, 2004; Pape et al., 2005; Zucker & Kozma, 2003). Both the MHVS and the VHS rely upon an asynchronous delivery model.

The second view was based upon the CDLI. As it was described in Chapter Five, new CDLI e-teachers often go from the traditional classroom into the virtual classroom with only a few days of face-to-face professional development. I speculated that this may be the reason why the e-teachers in the study relied so heavily upon the synchronous instructional tools and made little or only sporadic use of the asynchronous tools. The teachers' reliance on synchronous methods is consistent with the literature on adopting innovations: at early stages of the adoption process, people tend to be drawn to innovations that are consistent with what they already know, believe, and do, along with innovations that they perceive as allowing them to complete tasks more effectively and/or efficiency (e.g., Rogers, 2003; Surrey & Ely, 2007). Simply put, CDLI e-teachers may not have had an opportunity to try out the asynchronous teaching tools in ways that made them comfortable with using the tools. As a result, it appears that the teachers were not able to develop asynchronous teaching strategies that were easy to implement, offer benefits to synchronous instruction, and were consistent with the e-teacher's own beliefs about effective instruction.

The CDLI needs to develop a more effective professional development program for their e-teachers, particularly in the area of asynchronous instruction. While the CDLI has created an environment that allows for the sharing of best practices in both face-to-face and synchronous online environments (M. Barry, personal communication, May 19,

2006), this does not appear to be enough to encourage e-teachers to adopt the examples of useful asynchronous teaching strategies currently being used by an isolated few (see Figures 5.5-5.13). The use of an online professional development course offered through asynchronous delivery, similar to the ones used by the MVHS and the VHS, may be a useful way to address this need. For example, teachers who complete the VHS professional development program "discuss what does and doesn't work effectively online, and reflect on the nature of the new medium they are experiencing as students during their training and will later employ as instructors during the delivery of their course" (Pape et al., 2005, p. 122). Having to experience this kind of environment may allow e-teachers to see asynchronous instructional strategies that offer "a better way to do something; [are] compatible with their values, beliefs and needs; [are] not too complex; can be tried out before adoption; and [have] observable benefits" (Surrey & Ely, 2007, p. 106), all keys to the successful adoption of new innovations.

Creating Community

The students at Beaches All Grade felt little or no sense of community with their online classmates. This was often cited during the interviews as a reason why students interacted in the virtual classroom through direct messaging rather than over the microphone. The students indicated that they felt little connection to their online classmates because they did not know them. Carabajal, Lapointe and Gunawardena (2003) identify the social element as one of the three dimensions in online group development, while Palloff and Pratt (2005) argue that the first stage of online group development is to build trust among the members. For the CDLI students at Beaches All Grade, these online students were only a name on a screen during the synchronous class

time, and the students at Beaches did not know what their online classmates looked like or anything about them.

Menneche, Hoffer and Wynn (1992) described the process of individuals becoming a group as "cohesion… over time as members interact, learn about one another, and structure relationships and roles within the group" (p. 526). The CDLI students at Beaches rarely interacted with their online classmates and knew little about them. Johnson, Suriya, Yoon, Berrett and Fleur (2002) provided strategies to improve group or community development in virtual environments, for example, CDLI e-teachers could assign activities with appropriate tasks and clear objectives that had to be completed in groups by students from different schools. Constance, who was the only student to report working with students from another school, stated that "sometimes… we get in groups and we have to team up with our classmates, I could be with someone from LaSalle or you know, across the province anywhere." Beyond this isolated example, the students at Beaches were not required to work with their online classmates during synchronous class time. Given the reality that the students rarely used the discussion forum or internal mail system to contact their other students in WebCT, they also rarely interacted with their online classmates during asynchronous class time.

CDLI e-teachers need to utilize strategies during asynchronous instruction that foster interaction between students to allow them to learn more about each other and begin to develop relationships with each other. Johnson, Suriya, Yoon, Berrett and Fleur (2002) also suggested that teachers could allow students to complete low-risk or practice tasks that are designed to facilitate students from different schools working together. For example, Justine described:

> "at the beginning of the year he'll say, umm, try and get your pictures in and then one day or one period he'll say okay, I got some pictures and he'll just put them up on the screen, but we can only see them when he, when he does that."

While a positive step in providing an opportunity for the students to get to know each other better, as Justine pointed out, this particular instructional event was a one time occurrence that happened in the virtual classroom that students did not have the ability to review as the course progressed. This particular event may have been more successful had it occurred in a space that allowed students to access it repeated ties throughout the course (e.g., a discussion forum or a class website). Finally, Johnson, Suriya, Yoon, Berrett and Fleur (2002) suggested that CDLI e-teachers could assign projects that have timelines that allow enough time for students at different schools to work together, but that provide sufficient motivation to require students to collaborate outside of their synchronous class time.

These three strategies by Johnson et al are simply one way to facilitate the process of students getting to know their online classmates and the development of a sense of community among these virtual school students. There are other models available (e.g., Carabajal et al., 2003; Conrad & Donaldson, 2004; Hill, 2002; Palloff & Pratt, 2005; Tuckman, 1965), and regardless of which one is selected, the CDLI e-teachers need to utilize strategies that will foster interaction between students during both the synchronous and asynchronous class time. As Hill (2002) maintained, the creation of a community will not just happen, nor can it be directed by an e-teacher. However, this increased interaction may allow students to learn more about each other, which may facilitate the development of a sense of community among online classmates.

Supporting Students Online

In his book *A Classroom of One*, Maeroff (2003) described how online learning programs (such as virtual schools) have a tendency to focus on technical support and pay little attention to academic support. He indicated that "a lack of academic support can exacerbate feelings of isolation and undermine online students" (p. 110), and then proceeded to describe the use of e-tutors by SMARTHING, Inc. and the use of counseling services by Penn State's World Campus. The CDLI also provided e-tutors and had a full-time guidance counselor on staff, along with providing students with access to asynchronous course content, multimedia learning objects (MLOs), and co-curricular activities. However, as has been asked of many e-learning initiatives – if you build it, will they come? (e.g., Geisman, 2001; Kestner, Hall, Limbach, & Butler, 1999; Sugarman & Weisel-Eichler, 2005).

In the case of the CDLI students at Beaches All Grade the answer was no. The students reported that they did not even know about some of these sources of academic support, such as the MLOs, and even after they found out about these sources of support, the students did not use them. Students reported that did not make use of their asynchronous course content because their e-teachers did not use it or they did not understand how the content was supposed to be used. In their discussion of challenges that needed to be addressed in digital learning environments, Hill and Hannafin (2001) identified resources and tools as two of the four components necessary for effective resource-based learning environments. Resources included the static and dynamic items that learners could use to access the course content, while "tools aid in locating, accessing, and manipulating resources, and in interpreting and evaluating their

usefulness" (p. 43). Also, in their discussions of a third component, scaffolds, the authors described the use of "procedural scaffolds [to] help learners use resources" (p. 45). The CDLI has already provided resources to support their learners in this digital environment, but they have not given their students the scaffolding tools necessary to find, evaluate, and use those resources.

In their book describing how to prepare, design, and teach an online course based upon the VHS model, Elbaum, McIntyre and Smith (2002) indicated e-teachers need to "advertise how to get help" (p. 41) and "make it known" (p. 74). CDLI e-teachers need to inform students, both during synchronous class time and in the asynchronous course material, of the variety of sources of content-based assistance that the students have available to them. CDLI e-teachers also need to make sure that students know and understand how to use these various sources and what purpose each source serves. For example, the MLOs are essentially detailed tutorials about specific topics and are quite useful to students who may be struggling to understand a concept. The asynchronous course content lessons, however, are designed to introduce students to a topic, provide them with information about that topic and an opportunity to practice or use that new knowledge, and then give students the opportunity to self-assess their understanding of that topic.

In describing the operation of the Wichita e-School, Morris (2002) discussed the use of an orientation for students that was available in the course management system. E-teachers used this orientation at the beginning of the course to provide students a chance to find out where things were and how to use those things. This is consistent with Hill and Hannafin (1997), who found that orientation of learners on where to find needed

resources within a system and the strategies for using these items were important to students in a post-secondary technology for educators course. An orientation to ensure that students know what sources of support are available to them, along with how to and why they should access them may be a useful model for the CDLI to adopt.

Finally, students reported that they were unable to access e-tutors because their connectivity at home, where the Beaches students were when the e-teachers were available, did not allow for the students to access the virtual classroom. The issue of home Internet access is one that is continuing to improve in rural Newfoundland and Labrador, through private-public partnerships. For example, the provincial and federal Governments signed an agreement in 2005 to "provide broadband [Internet] access to 68 schools and 103 communities, located in the rural and remote regions of Newfoundland and Labrador" (Government of Canada, 2005). While improvements to connectivity and bandwidth will occur as technology improves and the market demands, more government involvement is needed to ensure that rural and remote areas have access to these improved services.

Implications for Future Research

Resembling many studies of online learning systems, this study was designed to be an exploratory study to gain a better understanding of the online learning program the CDLI. This has been similar to most of the research that I have conducted into virtual schooling in general, and more specifically with the CDLI (see Barbour, 2005a, 2006a; Barbour, 2007; Barbour & Cooze, 2004; Barbour & Mulcahy, 2004; Barbour & Mulcahy, 2006, 2007). In all of these studies, including this study, I have examined some aspect of virtual schooling and based upon that examination made recommendations for both

practice and future research. In some instances I have followed through and pursued some of the recommendations for future research, however, the impact of my research on the practice of virtual schooling within the programs that I have studied has been limited or non-existent. There have been no changes or improvements in the system on which I have sought to understand and have an impact (Reeves, 2000).

In his chapter examining the "no significant differences" phenomenon in online learning, Reeves (2005) calls for the use of design/development research "to provide design guidelines for developing and implementing effective online teaching and learning environments" (p. 303). Design/development research is "a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories" (Wang & Hannafin, 2005, pp. 6-7). Essentially, design/developmental research is a methodology which is conducted in cycles to allow for results from the intervention to be included in improving the intervention before the next cycle, while developing principles and theories to explain those results and guide further refinements in the intervention. As Reeves (2005) describes, "our paramount goal of research should be solving teaching, learning, and performance problems, and deriving design principles that can inform future decisions" (p. 304).

In this section I describe five areas for future research that could be explored as design/development research problems. The first is the need to improve the asynchronous teaching strategies exhibited by CDLI e-teachers. Second, there is a need for a better understanding of the virtual school experience of lower performing students. The third

area for future research is to improve upon the identification of characteristics necessary to be successful in virtual school environments, and to be able to provide remediation for students who are identified as being weak in certain characteristics. Fourth, as students reported that their primary source of support was their classmates, research is needed to investigate how e-teachers and in-school teachers can encourage greater interaction and sense of community to allow students to learn in the social process from their more capable peers. Finally, research is needed to go beyond comparing the performance of students in virtual schools with students in brick-and-mortar schools, to consider the quality of learning experience that students receive in virtual learning environments.

Asynchronous Teaching Strategies

As it was described in Chapter Five, the students were primarily assigned practice questions or time to work on their assignments during their asynchronous class time. The students found this work routine and unchallenging, and they often lacked the internal motivation to complete this work during the scheduled time (Blumenfeld et al., 1987; Deci, 1975; Harter, 1978; Miller & Meece, 1997, 1999; Perry, 1998; Perry et al., 2003; Perry & VandeKamp, 2000; White, 1959). The lack of on-task behavior during their asynchronous class time meant that much of the work assigned was completed at home, usually just before a deadline. The exceptions to this trend were Jasmine's fine arts course and Kathy's science course. Jasmine reported spending an average of 80% of her asynchronous time on task, while Kathy spent an average of 90% of her asynchronous class time in science on task. Other than being the only students enrolled in each of those courses, although not the only students in the distance education room at that time, the e-

teacher of these two students were also the only two e-teachers of Beaches' students who made frequent use of the course content in WebCT.

I also outlined a variety of ways the e-teachers used the course management system (i.e., WebCT) to support student learning during their asynchronous class time (see Figures 9 through 18). However, my observations indicated that few e-teachers used a majority of these strategies and in most cases these examples were isolated to a small number of e-teachers or were used infrequently. While this was a limitation of the instructional practices of CDLI e-teachers, it is the only or primary method of instruction for the majority of virtual schools in the United States. As it was discussed in Chapter Two, few studies have examined effective teaching strategies in virtual schooling, particularly asynchronous teaching methods (Cavanaugh, 2007; Clark, 2007; Rice, 2006). Some have provided personal accounts of strategies that teachers at the Florida Virtual School and the VHS have found useful (Elbaum et al., 2002; Johnston, 2004; Johnston & Mitchell, 2000; Pape et al., 2005; Zucker & Kozma, 2003), but there has not been systematic studies of best practices of asynchronous teaching strategies, or even virtual school teaching strategies (Hill et al., 2004).

The work that is currently being conducted through the Teacher Education Goes into Virtual Schooling project is one exception to this lack of research. At present, researchers at Iowa State University, the University of Florida, the University of Virginia, and Graceland University are evaluating a new teacher education program that focuses upon teaching in a virtual school environment (e.g., Davis, 2007; Davis, Niederhauser, Compton, Lindstrom, & Schoeny, 2005; Davis & Roblyer, 2005; Davis & Roblyer, 2005, 2006; Davis, Roblyer, Charania, & R., submitted; Harms, Niederhauser, Davis, Roblyer,

& Gilbert, under review). However, more work is needed to ensure that virtual school teachers have access to instructional strategies, particularly asynchronous instructional strategies, which have a foundation in research that is based upon theoretical fundamentals.

Lower Performing Students

While research has indicated that the majority of students who enroll in virtual school courses are A or B students (Mills, 2003; Watkins, 2005; Wigent & Oswalt, 2004), this was not the case at Beaches All Grade. None of the CDLI students at Beaches were A students and only three of the students were B students.[19] The remaining nine students were all C or D students (see Table 6.2).

Table 6.2. CDLI student performance

Student	CDLI Average	Classroom Average	Overall Average	Difference Between CDLI and Classroom Averages
Cassandra	55.0	72.9	70.6	-15.9
JD	63.0	79.1	75.6	-16.1
Peter	70.5	79.5	77.3	-9.0
Mya	63.0	81.7	79.4	-18.7
Jasmine	97.0	82.9	84.6	14.1
Kathy	86.7	91.0	89.1	-5.7
Justine	68.0	79.8	75.4	-11.8
Max	68.7	80.5	75.9	-10.8
Darlene	71.0	75.8	75.1	-4.8
Dayna	65.0	72.3	71.9	-7.3
Norah	73.0	83.2	80.6	-10.2
Kevin	50.0	61.4	60.1	-11.4
Mean	*69.2*	*78.3*	*76.3*	*-9.1*

Even though the majority of these students had C averages, most of these students were seen by the staff at Beaches All Grade as academically successful. The main exception to

[19] While I have only used eight students for the data analysis, it is beneficial to the reader to discuss the issue of lower performing students using all twelve CDLI students – as one of the students excluded from the analysis was of particular interest through this lens.

this view was Kevin.[20] Kevin was an anomaly among his CDLI student colleagues at Beaches because he was the only student that was perceived to be academically weak. It was unfortunate that he failed to participate in the final two interviews and had to be excluded from my analysis because there is currently no research that considers the experience of lower performing students in virtual school environments.

What is needed is additional research that focuses specifically on lower performing students like Kevin. As Scherer (2006) indicated in her discussion of student issues related to virtual schooling, "the sample of students needs to be broadened to determine if these findings hold true for a greater number of students…" (p. 19). Research studies that investigate the virtual school learning experience for lower performing students will aid teachers and administrators as this particular population of students continues to grow within virtual schools.

Remediation of Virtual Schooling Skills

The number of students enrolling in virtual school courses is growing (Fulton, 2002a; Gray & Tucker, 2006; Huerta & González, 2004; Picciano & Seaman, 2007; Setzer & Lewis, 2005). The range of students enrolling in virtual school courses is also expanding (Barbour & Mulcahy, 2007, April; Cavanaugh, 2007; Rice, 2006). However, the ability of virtual schools to support these students appears to be limited, at least this was the case with the CDLI and the students at Beaches All Grade. These students either did not know about or chose not to take advantage of many of the support structures put in place by the CDLI. Instead they chose to rely upon their e-teachers, their in-school teachers, and each other for content-based assistance. Even with this support network,

[20] For a complete description of Kevin, and the other three students excluded from the analysis portion of this dissertation, see Appendix Q.

eleven of the twelve students had an average in their CDLI courses that was five to twenty percent less than the average for their classroom-based courses. Obviously, there could be a variety of reasons for these differences from the level of difficulty of their CDLI courses to the lack of student engagement in their CDLI courses to the poor design and delivery of their CDLI courses. The question of what could have been done differently for this group of students remains unanswered. Nonetheless, some speculation is warranted based upon the findings of my study.

There were likely many factors that influenced the student-participants' online learning experiences, however, were there measures that could have been taken to prevent the average nine percent difference between the Beaches All Grade students' classroom-based grades and their CDLI grades? For example, had the students taken the Educational Success Prediction Instrument (ESPRI) at the beginning of the school year, could their e-teachers, their in-school teachers, or the CDLI have done anything to address the students' weaknesses? Jesse had the poorest score of any of the students on the Responsibility and Risk Taking variable, Constance scored a little poorer on the Achievement and Self-Esteem variable, and JD scored poorer on the Organization and Self-Regulation variable. All of these of these students scored 15%-20% lower in their CDLI courses than in their classroom-based courses. Would knowing this information at the beginning of the school year and providing remediation for these missing skills necessary for success in a virtual school environment have made a positive difference in these students' performance in their CDLI courses? Based upon the current research on virtual schooling it is impossible to determine because not enough has been done in this area.

In Chapter Two I discussed a series of authors who have called for additional research into the factors that affect student success in virtual school environments (Butz, 2004; Clark, 2003; Dickson, 2005; McLeod et al., 2005). The ESPRI developed by Roblyer and Marshall (2002-2003) is a good first step in this line of inquiry, as the authors have identified four variables or characteristics that affect success in a virtual school environment and have an instrument that can reliably predict student success based upon those variables. However, even the authors acknowledge there is more work to be done.

> Our results, although promising, should be viewed as preliminary for this population. The next step to confirm the validity of the ESPRI and to test the predictive model is o use it with additional groups of VHS students to determine if the instrument discriminates as well between pass/fail groups in other populations as it did this one. (p. 253)

Roblyer (2005) went even further and stated that the next step in this line of inquiry was "to develop preparation materials to help students whose ESPRI results indicate potential for problems in online learning" (The Dropout Rate Problem: What Makes an Effective Online Student?, ¶9).

These statements are consistent with Rice (2006), who suggested that researchers needed to "continue and expand on the development of prediction instruments that help identify successful learner attributes" (p. 442). Cavanaugh (2007) followed Roblyer's later vision, and called for "predictive instruments, diagnosis, and prescription of services and scaffolds [to] enhance every students' chance of success while increasing the efficiency of teachers" (p. 159). Smith, Clark and Blomeyer (2005) were even more

specific in their call for more research into student process skills, motivation, and learner characteristics in an effort to better understand and be able to improve upon the experiences of virtual school students.

Developing Community with Virtual School Students

In Chapter Five I described how the students at Beaches All Grade had developed a strong sense of community with their local peers, but little or no sense of community with their online classmates. I speculated that the local community developed because of the students' shared goals and their sense of cooperation when they were engaged in their CDLI work. The lack of online community I attributed to a perceived lack of social presence among the students online. This was consistent with Kazmer (2000), who argued that social presence and interaction were necessary for building a community.

The development of learning communities among CDLI students enrolled in the same course at Beaches All Grade was likely not a new concept. With distance education programs for more than a decade, students in previous years had most likely relied upon each other for support and assistance both inside and outside of school. However, the 2005-06 school year was the first time that these informal learning communities extended beyond the school walls in such a formal and frequent basis, as it did with the students enrolled in the specific mathematics and science CDLI courses. I refer to this learning community as informal due to the control exerted by the learners over why they met, where they met, and how they met (Rossett & Hoffman, 2007). While the investigation of this particular learning community was beyond both the scope and the methodology of this present study, the development and operation of this learning community warrants further investigation, particularly given that the students who were a part of it referred to

it as the most useful source of assistance in their support network. Studies that consider how and why this learning community formed, along with why it did not occur in other courses at Beaches All Grade are studies that would produce useful information in helping to foster these communities in other rural schools.

Research into the field of learning communities in online learning environments is growing (e.g., Alavi & Dufner, 2004; Berg, 1999; Carabajal et al., 2003; Dirkx & Smith, 2004; Fung, 2004; Hill, 2002; Hill, Raven, & Han, in press; Kollock, 1998; McAlpine, 2000; Rovai, 2001; Stacey, 1999). However, the research into online learning communities is almost exclusively focused upon adult populations. In fact, all of the articles listed above focus on adult learners. Simply put, there is a shortage of research exploring the development of online learning communities at the K-12 level. In addition, recent suggestions of the types of research involving virtual schooling that was needed failed to include research into how teachers can help foster a sense of community among virtual school students. This is clearly an area where further research could impact both the practice of virtual schooling and the experience had by virtual school students.

In addition to research on the development of online learning communities in virtual school environments, in Chapter Five I speculated that the lack of perceived social presence was a factor in the lack of a sense of online community with the CDLI students at Beaches All Grade. Originally a theory in the field of communications, researchers have applied social presence theory to distance education environments since the 1990s, particularly with regards to computer-mediated communication and online discussion forums (e.g., Gunawardena, 1995; Gunawardena & Zittle, 1997; Hackman & Walker, 1990; Rourke, Anderson, Garrison, & Archer, 2001; Swan & Shih, 2005). At the turn of

the millennium researchers began to apply social presence theory in a more general manner to students' complete online experience (e.g., Jelfs & Whitelock, 2000; Lowell, 2004; Picciano, 2002; Richardson & Swan, 2003; So, 2006; Tu, 2000, 2001, 2002; Tu & McIsaac, 2002). However, like research into online learning communities, these studies have almost exclusively been conducted with adult populations.

The one exception to this is Nippard (2005) who examined the role CDLI e-teachers played in fostering social presence in the virtual classroom during synchronous class time. Nippard concluded that "[e-teachers] manifested social presence in the context of task-oriented interaction…. relying on the two-way audio," while "students in the context of digressions…. showing a reliance on DM [direct messaging]" (p. 117). Based upon these conclusions, he called for future research into "the types of interaction and communication that takes place through students' use of the DM [direct messaging]" and how e-teachers reacted to this use. Based upon the results of this study, I would expand Nippard's call to also include the role students' interactions and communications have in creating a sense of community between students and their online classmates.

Quality of Student Learning Experiences in Virtual Environments

In Chapter One I described the results of two meta-analyses (i.e., Cavanaugh, 2001; Cavanaugh et al., 2004) that found that student performance of virtual school students was equivalent to student performance in brick and mortar schools based upon final course averages and/or mandatory examinations. In Chapter Two I discussed comparative studies conducted by Cavanaugh et al. (2005) and McLeod et al. (2005) which found that student performance was higher among virtual school students than their brick and mortar counterparts on non-mandatory assessments of student learning. In

Chapter Five I described the experiences of students during their allocated synchronous and asynchronous class time. However, there was no discussion about the quality of the students' learning experience in this virtual environment.

Archbald and Newmann (1988) argued that the types of learning measured by the forms of assessments utilized in the studies referenced in the previous paragraph are "often considered trivial, meaningless, and contrived by students and adult authorities" (p. 1), while Kohn (2000) found that there is "a statistical association between high scores on standardized tests and relatively shallow thinking" (p. 10). These authors advocate the assessment of a more worthwhile and meaningful form of achievement – authentic achievement. According to Wehlage, Newmann and Secada (1996), authentic achievement is based upon "construction of knowledge, disciplined inquiry, and value of learning beyond school" (p. 22). This achievement is realized through instruction that includes "higher order thinking, deep knowledge of a topic, substantive conversation between teacher and students and among students, [and] helping students develop connections between the knowledge and the world beyond the classroom" (Newmann, Secada, & Wehlage, 1995, p. 42).

Discussion about the quality of the students' learning experience in this virtual environment is beyond the scope of this particular study. However, Berge and Clark (2005) cited the ability to provide high-quality learning opportunities as one of their five benefits of virtual schooling. Thomas (2000) described thirty-one guidelines to ensure quality in the design of web-based courses for middle and high school students, while Thomas (2003) provided a twenty-six item rubric for the evaluation of high-quality online teaching. To date there has been little research, using these two instruments or

others, which evaluate the claim that virtual schools provide high-quality learning experiences for their students beyond simply measuring student performance on "trivial, meaningless, and contrived" assessments. As the need for students to avail themselves of courses offered by virtual schools continues to increase, further research is needed to examine the quality of student learning experiences in these virtual environments.

Chapter Summary

The purpose of this study was to examine the nature of web-based learning in Newfoundland and Labrador secondary education. Specifically, this study examined how students interacted with their web-based courses and the process they undertook when they needed help. This study was guided by the following questions:

1. What were the students' experiences during their synchronous time online?
2. What were the students' experiences during their asynchronous time online?
3. When students required content-based assistance, where do they seek that assistance and why do they choose those sources?

To address these questions, eight students engaged in CDLI courses at a rural all grade school were selected as a convenient and purposeful sample.

During the students' synchronous class time they were taught in much the same manner as they would have been in a traditional classroom. In fact, the majority of the instruction of the CDLI students at Beaches All Grade occurred during their synchronous class time. However, during their asynchronous class time students were often assigned seat work or provided time to work on assignments. Students rarely used this time to complete their CDLI work, instead they used this time to talk to friends, explore the Internet, or engage in other off-task behavior. The students primarily relied upon their

local classmates when they needed content-based assistance. If their colleagues were unable to help, they turned to their e-teacher or if they needed more immediate assistance they would seek out their in-school teachers. Students rarely or never used the other sources of support provided by the CDLI.

These results indicated that there were three instructional practices that the CDLI needed to address. The first was to provide better instruction during asynchronous class time. The second was that CDLI e-teachers need strategies that allow students to get to know their online classmates better to develop a sense of community online. The third was helping students to recognize the availability of CDLI-provided resources and to understand when and how to use all of the various sources of support provided by the CDLI.

Finally there were five areas for future research that could be explored as design/development research problems. The first was research to identify best practices for asynchronous teaching strategies. The second was research to better understand the experience of lower performing students in virtual school environment. The third was research to improve upon the identification of characteristics necessary to be successful in virtual school environments and to provide remediation for students who are identified as being weak in certain characteristics. The fourth was research on how e-teachers and in-school teachers could encourage greater interaction and between in-school and online classmates. The fifth was research that examines the quality of student learning experiences in virtual school environments.

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Appendices

Appendix A

Semi-Structured Interview Guide for First Monthly Interview (A)[21]

1. Could you tell me a little about yourself?
   Probes
   What grade are you in?
   How old are you?
   Where do you live?

2. Could you tell me a little about your school?
   Probes
   What kind of school is it (i.e., what grades does it include)?
   Roughly how many students are in your school?

3. Could you tell me about the web-based courses have you taken?
   Probes
   How many?
   Over how long a period?
   Which ones? When?

4. Think back to your last online class. Describe for me what you did.
   Probes
   Did you take notes?
   Did you talk to other students online?
   Did you talk to other students in the room with you?
   Did you do things other than pay attention to the Elluminate Live stuff?
   Was this a typical online class?
   If not, how was it different?

5. Think back to your last offline class. Describe for me what you did.
   Probes:
   Where did you go?
   Would you say you were working on your course for most of that class?
   What percentage of time would you say you were on-task?
   Was this a typical offline class?
   If not, how was it different?
   Where would you normally go?
   Would you say you are working on your course for most of your offline classes?
   What percentage of time would you say you are on-task?

[21] As there were changes made to the protocol after the third student interview, the protocols for both the first and second months have A and B versions to ensure all students were asked the same questions.

6. Think about a time during the past month when you felt you learned a specific concept or process or mastered a specific skill. Describe it for me.

    Probes:

    What did you do first? Next?

    What was the last thing you did before you figured it out?

    What resources did you use?

        Recorded Elluminate Live sessions

        Course content in WebCT

        Your own notes

        Your textbook

        Different sites on the world-wide web

    Who did you seek help from?

        Your e-teacher

        An e-tutor

        Other students in that class

        Other students in your school

        Teachers in your school

        Your parents or relatives

Semi-Structured Interview Guide for First Monthly Interview (B)

1. Could you tell me a little about yourself?
   Probes
   What grade are you in?
   How old are you?
   Where do you live?

2. Could you tell me about the web-based courses have you taken?
   Probes
   How many?
   Over how long a period?
   Which ones? When?

3. What is your work area like at home?
   Probes
   Do you have a computer?
   Is it located where you do most of your homework?
   Does it have access to the Internet?
   Are you able to use all parts of WebCT from your home computer?
   Are you able to use ELive from your home computer?
   Do you share your home computer with someone else in the family?

4. Could you tell me a little about your school?
   Probes
   What kind of school is it (i.e., what grades does it include)?
   Roughly how many students are in your school?

5. Think back to your last online class. Describe for me what you did.
   Probes
   Did you take notes?
   Did you talk to other students online?
   Did you talk to other students in the room with you?
   Did you do things other than pay attention to the Elluminate Live stuff?
   Was this a typical online class?
   If not, how was it different?

6. Think back to your last offline class. Describe for me what you did.
   Probes:
   Where do you complete your work?
   Where did you go?
   Would you say you were working on your course for most of that class?
   What percentage of time would you say you were on-task?
   Was this a typical offline class?
   If not, how was it different?
   Where would you normally go?
   Would you say you are working on your course for most of your offline classes?
   What percentage of time would you say you are on-task?

7. Think about a time during the past month when you felt you learned a specific concept or process or mastered a specific skill. Describe it for me.
   Probes:
   What did you do first? Next?
   What was the last thing you did before you figured it out?
   What resources did you use?
      Recorded Elluminate Live sessions
      Course content in WebCT
      Your own notes
      Your textbook
      Different sites on the world-wide web
   Who did you seek help from?
      Your e-teacher
      An e-tutor
      Other students in that class
      Other students in your school
      Teachers in your school
      Your parents or relatives

8. What is it you like about your CDLI classes?
   Probes:
   Do you prefer your CDLI classes or your classroom based classes? Why?
   Are your CDLI classes more work, less work or about the same compared to your classroom-based classes?
   Think of something from your classroom-based classes that you wish you had more of in your CDLI classes? Why?
   Think of something from your CDLI classes that you wish you had more of in your classroom-based classes? Why?

9. Is there anything else about your CDLI classes that you'd like to tell me about?

10. Is there anything else about where you go to for help with your CDLI courses that you'd like to tell me about?

Appendix B

Semi-Structured Interview Guide for Second Monthly Interview (A)

1. Last interview we started with you telling me a little bit about you and your school, this time I'd like to start with some information about your habits and uses of technology. Can you describe for me the type of technology you use on a regular basis at home?
   Probes
   You mentioned last interview that you had a home computer, what kinds of things do you use it for?
   Do you have a digital camera? How do you use it?
   Do you have a cell phone? Do you use it to text message? To take pictures?
   Do you have some form of game station at home? How often do you play? How much time do you average playing it per week?
   Do you watch much television? How much time do you average watching it per week?
   Do you read books? Magazines? Newspapers? The print versions or online?
   Do you e-mail people that you have never met in person? Describe for me the relationship that you have with these people?
   Do you instant message people that you have never met in person? Describe for me the relationship that you have with these people?

2. What is your work area like at home?
   Probes
   Do you have a computer?
   Is it located where you do most of your homework?
   Does it have access to the Internet?
   Are you able to use all parts of WebCT from your home computer?
   Are you able to use ELive from your home computer?
   Do you share your home computer with someone else in the family?

3. Let's talk for a minute about how your write. If you had a writing assignment due to school, how would you approach it?
   Probes
   Would you write a draft on paper first or on the computer?
   Do you write in a linear way (i.e., from beginning to end)?
   Once you have it on the computer, do you edit on the screen or would you print it off to edit it?
   If you were in the library doing research for this paper, would you look for information in a book or encyclopedia first or would you search for it on the web first?
   Would this process change if this was a CDLI course compared to a classroom course?

4. Think back to your last online class, what class was it? Describe for me what you did.
   Probes
   Did you take notes?
   Did you talk to other students online?
   Did you talk to other students in the room with you?
   Did you do things other than pay attention to the Elluminate Live stuff?
   Was this a typical online class?
   If not, how was it different?

5. Think back to your last offline class, what class was it? Describe for me what you did.
   Probes:
   Where do you complete your work?
   Where did you go?
   Would you say you were working on your course for most of that class?
   What percentage of time would you say you were on-task?
   Was this a typical offline class?
   If not, how was it different?
   Where would you normally go?
   Would you say you are working on your course for most of your offline classes?
   What percentage of time would you say you are on-task?

6. Think about a time during the past month when you felt you learned a specific concept or process or mastered a specific skill. Describe it for me.
   Probes:
   What did you do first? Next?
   What was the last thing you did before you figured it out?
   What resources did you use?
      Recorded Elluminate Live sessions
      Course content in WebCT
      Your own notes
      Your textbook
      Different sites on the world-wide web
   Who did you seek help from?
      Your e-teacher
      An e-tutor
      Other students in that class
      Other students in your school
      Teachers in your school
      Your parents or relatives

7. What is it you like about your CDLI classes?
   Probes:
   Do you prefer your CDLI classes or your classroom based classes? Why?
   Are your CDLI classes more work, less work or about the same compared to your classroom-based classes?
   Think of something from your classroom-based classes that you wish you had more of in your CDLI classes? Why?
   Think of something from your CDLI classes that you wish you had more of in your classroom-based classes? Why?

8. What is it you dislike about your CDLI classes?
   Probes:
   Are there any things that the teacher could do to address these concerns? If so, what?
   Is there anything that the CDLI could do to address these concerns? If so, what?

9. Is there anything else about your CDLI classes that you'd like to tell me about?

10. Is there anything else about where you go to for help with your CDLI courses that you'd like to tell me about?

Semi-Structured Interview Guide for Second Monthly Interview (B)

1. Last interview we started with you telling me a little bit about you and your school, this time I'd like to start with some information about your habits and uses of technology. Can you describe for me the type of technology you use on a regular basis at home?

   Probes

   You mentioned last interview that you had a home computer, what kinds of things do you use it for?

   Do you have a digital camera? How do you use it?

   Do you have a cell phone? Do you use it to text message? To take pictures?

   Do you have some form of game station at home? How often do you play? How much time do you average playing it per week?

   Do you watch much television? How much time do you average watching it per week?

   Do you read books? Magazines? Newspapers? The print versions or online?

   Do you e-mail people that you have never met in person? Describe for me the relationship that you have with these people?

   Do you instant message people that you have never met in person? Describe for me the relationship that you have with these people?

2. Let's talk for a minute about how your write. If you had a writing assignment due to school, how would you approach it?

   Probes

   Would you write a draft on paper first or on the computer?

   Do you write in a linear way (i.e., from beginning to end)?

   Once you have it on the computer, do you edit on the screen or would you print it off to edit it?

   If you were in the library doing research for this paper, would you look for information in a book or encyclopedia first or would you search for it on the web first?

   Would this process change if this was a CDLI course compared to a classroom course?

3. Think back to your last online class, what class was it? Describe for me what you did.

   Probes

   Did you take notes?

   Did you talk to other students online?

   Did you talk to other students in the room with you?

   Did you do things other than pay attention to the Elluminate Live stuff?

   Was this a typical online class?

   If not, how was it different?

4. Think back to your last offline class, what class was it? Describe for me what you did.
   Probes:
   Where do you complete your work?
   Where did you go?
   Would you say you were working on your course for most of that class?
   What percentage of time would you say you were on-task?
   Was this a typical offline class?
   If not, how was it different?
   Where would you normally go?
   Would you say you are working on your course for most of your offline classes?
   What percentage of time would you say you are on-task?

5. Think about a time during the past month when you felt you learned a specific concept or process or mastered a specific skill. Describe it for me.
   Probes:
   What did you do first? Next?
   What was the last thing you did before you figured it out?
   What resources did you use?
      Recorded Elluminate Live sessions
      Course content in WebCT
      Your own notes
      Your textbook
      Different sites on the world-wide web
   Who did you seek help from?
      Your e-teacher
      An e-tutor
      Other students in that class
      Other students in your school
      Teachers in your school
      Your parents or relatives

6. Last interview we chatted a little bit about what you liked about your CDLI classes, what is it you dislike about them?
   Probes:
   Are there any things that the teacher could do to address these concerns? If so, what?
   Is there anything that the CDLI could do to address these concerns? If so, what?

7. Is there anything else about your CDLI classes that you'd like to tell me about?

8. Is there anything else about where you go to for help with your CDLI courses that you'd like to tell me about?

Appendix C

Semi-Structured Interview Guide for Third Monthly Interview

1. Think back to your last online class, what class was it? Describe for me what you did.
   Probes
   Did you take notes?
   Did you talk to other students online?
   Did you talk to other students in the room with you?
   Did you do things other than pay attention to the Elluminate Live stuff?
   Was this a typical online class?
   If not, how was it different?

2. Think back to your last offline class, what class was it? Describe for me what you did.
   Probes:
   Where do you complete your work?
   Where did you go?
   Would you say you were working on your course for most of that class?
   What percentage of time would you say you were on-task?
   Was this a typical offline class?
   If not, how was it different?
   Where would you normally go?
   Would you say you are working on your course for most of your offline classes?
   What percentage of time would you say you are on-task?

3. Think about a time during the past month when you felt you learned a specific concept or process or mastered a specific skill. Describe it for me.
   Probes:
   What did you do first? Next?
   What was the last thing you did before you figured it out?
   What resources did you use?
      Recorded Elluminate Live sessions
      Course content in WebCT
      Your own notes
      Your textbook
      Different sites on the world-wide web
   Who did you seek help from?
      Your e-teacher
      An e-tutor
      Other students in that class
      Other students in your school
      Teachers in your school
      Your parents or relatives

4. What types of things in your web-based courses have you found to be helpful in your learning? Why?

5. If you could change something(s) about your web-based course, what would it (they) be?
   Probes
   Why?

6. Think of a lesson in WebCT that you have experienced that you think was particularly good or particularly effective in helping you learn the material. Describe that lesson for me.
   Probes:
   Why was it effective?
   What type of multimedia components did it contain?
   What was your reaction to the lesson?

7. Think of a lesson in WebCT that you think was particularly bad or particularly ineffective in helping you learn the material. Describe that lesson for me.
   Probes:
   Why was it ineffective?
   What type of multimedia components did it contain?
   What was your reaction to the lesson?

8. If you had to make one statement about designing the WebCT lessons for you guys, what would it be? Why?

9. If the CDLI were designing a manual that was going to be given to every person who designed courses for them and they asked you to include one piece of advice for these individuals, what would it be? Why?

10. Is there anything else about your CDLI classes that you'd like to tell me about?

11. Is there anything else about where you go to for help with your CDLI courses that you'd like to tell me about?

Appendix D

Semi-Structured Interview Guide for Final Monthly Interview

1. Think back to your last online class, what class was it? Describe for me what you did.
   Probes
   Did you take notes?
   Did you talk to other students online?
   Did you talk to other students in the room with you?
   Did you do things other than pay attention to the Elluminate Live stuff?
   Was this a typical online class?
   If not, how was it different?

2. Think back to your last offline class, what class was it? Describe for me what you did.
   Probes:
   Where do you complete your work?
   Where did you go?
   Would you say you were working on your course for most of that class?
   What percentage of time would you say you were on-task?
   Was this a typical offline class?
   If not, how was it different?
   Where would you normally go?
   Would you say you are working on your course for most of your offline classes?
   What percentage of time would you say you are on-task?

3. Last month, students missed CDLI classes to get ready for graduation. In March, it happened during Education Week. How do you navigate absence in your CDLI courses?
   Probes
   How do you manage your online classes afterwards? Your offline classes?

4. Think about a time during the past month when you felt you learned a specific concept or process or mastered a specific skill. Describe it for me.
   Probes:
   What did you do first? Next?
   What was the last thing you did before you figured it out?
   What resources did you use?
      Recorded Elluminate Live sessions
      Course content in WebCT
      Your own notes
      Your textbook
      Different sites on the world-wide web
   Who did you seek help from?
      Your e-teacher
      An e-tutor
      Other students in that class
      Other students in your school
      Teachers in your school
      Your parents or relatives

For students in Mathematics 2205 and Physics 3204

5. It has been mentioned in previous interviews students in your Math 2205 and/or Physics 3204 get together outside of school on a regular basis. Tell me a little bit about these sessions.
   Probes
   How often?
   Where did you go?
   Would you say you were working on your course for most of that time?
   What percentage of time would you say you were on-task?
   Do you have sessions like this for any of your classroom-based courses?

6. What sources of help do you feel have been most useful to you this past year?
   Probes
   Why?
   What has been the second most useful?

7. Over the past year, have you sought out technical support?
   Probes
   Who have you gone to?
   How often?
   What type of support?

8. Why do you think you have been successful in your online course to date?
   Probes
   Are there characteristics that you possess which have helped you? What are they?
   Are there things that you do that have helped you? What are they?
   Are there things that your school does that have helped you? What are they?
   Are there things that your online teacher has done that have helped you? What are they?
   Are there things that the CDLI has done that have helped you? What are they?

9. What have you liked the most about your web-based courses?
   Probes
   Why?

10. What have you liked the least about your web-based courses?
    Probes
    Why?

11. If you could change something(s) about your web-based course, what would it (they) be?
    Probes
    Why?

12. What do you miss about face-to-face classes when you are in a web-based course? What do you miss about web-based courses when you are in a face-to-face class?
    Probes
    What is the difference in work load outside of class for you?
    Which is more? Why do you think that is?

13. One of the things that is typically discussed with web-based courses is the notion of community or feeling like you have connections with others when you are in class together, do you think that this has been an important aspect in your school experience?
    Probes
    Do you feel that you've had a community in your web-based classes?
    Has this community existed just with the students at your own school or with students from other schools as well?
    How would you compare the connections that you make with students in your face-to-face classes compared to your web-based classes?

14. What suggestions would you give to students who are taking web-based courses for the first time? What suggestions would you give to the designers of your web-based courses? What suggestions would you give to the teachers of your web-based courses?

15. Is there anything else about your CDLI classes that you'd like to tell me about?

16. Is there anything else about where you go to for help with your CDLI courses that you'd like to tell me about?

Appendix E

How the students defined success when asked if they had been successful in their online courses.

"We'll know after tomorrow with the public…" (Constance)

"With marks, pretty, pretty good I guess, but in actually learning, gaining knowledge, I'd say compared to the classroom, no I wouldn't say…" (Constance)

"I would say that if I was in a classroom for math or French my average would probably be a bit lower than they are in the online, rather than the online course." (JD)

"I haven't failed no test or nothing like that the year, so I'm doing pretty good…" (Peter)

"Like it's tested me a bit more than English in a normal classroom would, like, umm, I worked a lot harder for my marks…" (Mya)

"And I only ended up with like the same mark I'd always get, you know what I mean…" (Mya)

"I haven't failed any, I've been getting really good marks on them and everything…" (Kathy)

"Cause I've getting all of my assignments and lessons and that passed in on time and then paying attention in class…" (Jasmine)

"I really, really conscious of what I'm, like responsible for getting my schoolwork that I know and assignments that got to be done and I know when we have our tests and I really, really, really want to get them in on time, I hate having assignments not in on time and just responsible like that and independent, I can work on my own, no problem, doesn't bother me…" (Justine)

Appendix F

Semi-Structured Guide for School-Based Focus Group

Think about your CDLI classes since the beginning of this school year.

1. Describe for me what you do during a typical online class.

   Possible follow-up questions:
   Not what the teacher does or how they structure the lesson, but what do you do?
   Do you take notes?
   Do you talk to other students online?
   Do you talk to other students in the room with you?
   Do you do things other than *Elluminate Live* stuff?
   Do these other things distract you from the *Elluminate Live* stuff?

2. Describe for me what you do during a typical offline class.

   Possible follow-up questions:
   Where do you normally go?
   Would you say you are working on your CDLI course for most of your offline classes?
   Do you work on other courses during your offline classes? How often?
   What percentage of time would you say you are on-task?
   What percentage of time would you say you are doing school work?

3. Who do you do to for help when you can't figure something out? Why?

   Possible follow-up questions:
   Your e-teacher?
   An e-tutor?
   Other students in that class?
   Other students in your school?
   Teachers in your school?
   Your parents or relatives?
   What about technology problems? How often do they happen?

4. Where are some of the resources you use for help to figure stuff out? Why?

   Possible follow-up questions:
   Recorded *Elluminate Live* sessions?
   Course content in *WebCT*?
   Your own notes?
   Your textbook?
   Different sites on the world-wide web?

Appendix G

Semi-Structured Interview Guide for Norah's Interview

1. Could you tell me a little about yourself?
   Probes
   What grade are you in?
   How old are you?
   Where do you live?

2. Could you tell me about the web-based courses have you taken?
   Probes
   How many?
   Over how long a period?
   Which ones? When?

3. What is your work area like at home?
   Probes
   Do you have a computer?
   Is it located where you do most of your homework?
   Does it have access to the Internet?
   Are you able to use all parts of WebCT from your home computer?
   Are you able to use ELive from your home computer?
   Do you share your home computer with someone else in the family?

4. Can you describe for me the other type of technology you use on a regular basis at home?
   Probes
   You mentioned last interview that you had a home computer, what kinds of things do you use it for?
   Do you have a digital camera? How do you use it?
   Do you have a cell phone? Do you use it to text message? To take pictures?
   Do you have some form of game station at home? How often do you play? How much time do you average playing it per week?
   Do you watch much television? How much time do you average watching it per week?
   Do you read books? Magazines? Newspapers? The print versions or online?
   Do you e-mail people that you have never met in person? Describe for me the relationship that you have with these people?
   Do you instant message people that you have never met in person? Describe for me the relationship that you have with these people?

5. Let's talk for a minute about how your write. If you had a writing assignment due to school, how would you approach it?

   Probes

   Would you write a draft on paper first or on the computer?

   Do you write in a linear way (i.e., from beginning to end)?

   Once you have it on the computer, do you edit on the screen or would you print it off to edit it?

   If you were in the library doing research for this paper, would you look for information in a book or encyclopedia first or would you search for it on the web first?

   Would this process change if this was a CDLI course compared to a classroom course?

6. Could you tell me a little about your school?

   Probes

   What kind of school is it (i.e., what grades does it include)?

   Roughly how many students are in your school?

Appendix H

Semi-Structured Interview Guide for Beaches' Teacher Interviews

1. Can you tell me a bit about yourself?
   Probes
   How long have you been teaching? At Beaches All Grade?
   What subjects have you taught?

2. The CDLI students have indicated that they have come to your for help throughout the year. Can you describe for me the types of help that you have given the students over the past year?
   Probes
   How often?
   How much time does it take?
   Are you conscious of how often they come to you or how much time it takes?
   Do you recall if you spend more, less, or about the same amount of time providing help as you did with the old telemedicine system?

3. Are there other CDLI tasks or duties that you perform that take up your time?
   Probes
   How often?
   How much time does it take?

4. As a teacher in a school with distance education, what do you think that could be done to improve the system?

5. Is there anything else about your experiences with the CDLI that you'd like to tell me about?

Appendix I

Semi-Structured Interview Guide for Beaches' Administrator Interview

1. Can you tell me a bit about yourself?
   Probes
   How long have you been teaching? At Beaches All Grade?
   What subjects have you taught?

2. The CDLI students have indicated that they have come to your for help throughout the year. Can you describe for me the types of help that you have given the students over the past year?
   Probes
   How often?
   How much time does it take?
   Are you conscious of how often they come to you or how much time it takes?
   Do you recall if you spend more, less, or about the same amount of time providing help as you did with the old telemedicine system?

3. Are there other CDLI tasks or duties that you perform that take up your time?
   Probes
   How often?
   How much time does it take?

4. Do you screen which students can take CDLI courses?
   Probes
   What sort of characteristics do you use?
   What would you do if a student who normally wouldn't pass your screening expressed an interest in taking a CDLI courses?

5. What does the CDLI do for your school?
   Probes
   Advantages for the school? Disadvantages for the school?
   Advantages for the students? Disadvantages for the students?
   Advantages for the students not in CDLI courses? Disadvantages for the students not in CDLI courses?

6. As an administrator in a school with distance education, what do you think that could be done to improve the system?

7. Is there anything else about your experiences with the CDLI that you'd like to tell me about?

Appendix J

Semi-Structured Interview Guide for CDLI Interview

1. Can you describe for me your involvement with the CDLI?
2. What is the main purpose or mission of the CDLI?
3. As an organization, what does the CDLI do well?
4. What is one area where the CDLI, as an organization, could do better?
5. What do you feel are the main strengths of the CDLI teachers?
6. If you could plan a five day workshop, specifically for your CDLI teachers, what would you like to focus on?
7. What are the greatest non-instructional issues the CDLI is wrestling with?

Appendix K

Weekly Journal Prompt for Students

Thinking only about the content in my CDLI courses, this past week I sought help to figure out…

To help me figure this out I went to (you can have more than one place where you went to for help)…

[Possible answers may include: my online teacher, another student in my school, another student in my online class not at my school, a school-based teacher, a recorded ELive class, the material in WebCT, an MLO on the CDLI website, a CDLI e-tutor, a general Internet search, etc.]

I selected this source/these sources of help because…

Appendix L

A Survey of Online Learning Experiences

Section I – Dialogue

Likert Scale:

1 means NEVER
2 means ALMOST NEVER
3 means SELDOM
4 means SOMETIMES
5 means OFTEN
6 means FREQUENTLY
7 means VERY FREQUENTLY

1. Discussion specifically between you and your teacher.

1 2 3 4 5 6 7

2. Discussion among you and classmates.

1 2 3 4 5 6 7

3. Discussion among teacher and students in general.

1 2 3 4 5 6 7

4. Face-to-face interaction between you and teacher

1 2 3 4 5 6 7

5. Face-to-face interaction among you and classmates.

1 2 3 4 5 6 7

6. E-mail communication between you and teacher.

1 2 3 4 5 6 7

7. E-mail communication among you and your classmates.

1 2 3 4 5 6 7

8. Communication between you and teacher via fax, voice mail, or any electronic tool other than e-mail.

1 2 3 4 5 6 7

9. Communication between you and classmates via fax, voice mail, or any electronic tool other than e-mail.

1 2 3 4 5 6 7

Section II – Structure (Flexibility)

Likert Scale:
1 means EXTREMELY RIGID
7 means EXTREMELY FLEXIBLE

10. Teaching methods

1 2 3 4 5 6 7

11. Learning activities used in class

1 2 3 4 5 6 7

12. Pace of the course

1 2 3 4 5 6 7

13. Attendance

1 2 3 4 5 6 7

14. Objectives of the course

1 2 3 4 5 6 7

15. Choice of readings

1 2 3 4 5 6 7

16. Course requirements

1 2 3 4 5 6 7

17. Deadline of assignments

1 2 3 4 5 6 7

18. Grading

1 2 3 4 5 6 7

Section III – Learner Independence

Likert Scale:
1 means NOT AT ALL TRUE
7 means COMPLETELY TRUE

19. I am able to learn without lots of guidance.

1 2 3 4 5 6 7

20. I appreciate teacher's or classmates' support or approval. [

1 2 3 4 5 6 7

21. I like sharing efforts and responsibility with classmates

1 2 3 4 5 6 7

22. I am a self-directed learner.

1 2 3 4 5 6 7

23. I enjoy learning as a member of a team.

1 2 3 4 5 6 7

24. I am able to develop a personal learning plan.

1 2 3 4 5 6 7

25. I prefer learning in a group.

1 2 3 4 5 6 7

26. I am able to find resources for study.

1 2 3 4 5 6 7

27. I recognize my need for collaborative learning.

1 2 3 4 5 6 7

28. I regard myself as an independent learner.

1 2 3 4 5 6 7

29. I regard myself as an interdependent learner.

1 2 3 4 5 6 7

Section IV – Distance

Likert Scale:
1 means EXTREMELY CLOSE
7 means COMPLETELY DISTANT

30. Overall, how would you rate the distance between you and the teacher in this class.

1 2 3 4 5 6 7

31. Overall, how would you rate the distance between you and your classmates in this class?

1 2 3 4 5 6 7

Section V Social Presence

32. I found the environment to be

Impersonal 1 2 3 4 5 6 7 Personal

33. I found the environment to be

Hot 1 2 3 4 5 6 7 Cold

34. I found the environment to be

Distant 1 2 3 4 5 6 7 Close

35. I found the environment to be

Dehumanizing 1 2 3 4 5 6 7 Humanizing

36. I found the environment to be

Expressive	1	2	3	4	5	6	7	Inexpressive

37. I found the environment to be

Emotional	1	2	3	4	5	6	7	Unemotional

38. I found the environment to be

Insensitive	1	2	3	4	5	6	7	Sensitive

Section VI Fluency

39. I use electronic mail...

_____ less than once a week
_____ once a week
_____ a few times a week
_____ at least once a day

40. I have used email...

_____ only since I began this class
_____ in the last year
_____ for more than a year
_____ for more than 2 years

41. My level of expertise with email is...

_____ beginner (I can read and write email)
_____ intermediate (I can read, write, reply and forward email with only occasional problems)
_____ advanced (I can read, write, reply, forward email without problem)
_____ expert (I help other people deal with email problems)

42. My level of expertise in dealing with file attachments in email is...

_____ beginner (I think I can do it)
_____ intermediate (I can usually do it)
_____ advanced (I can always do it)
_____ expert (I help other people do it)

43. My level of expertise in dealing with my email address book is...

_____ beginner (I can use it, but don't know much about it)
_____ intermediate (I use it and keep it up to date)
_____ advanced (I use it, keep it up to date, and organized into sub-address books)
_____ expert (I help other people use it)

44. I have been browsing the World Wide Web for...

_____ less than a year
_____ a year
_____ 2 years
_____ more than two years

45. My level of expertise in dealing with information on the World Wide Web is...

_____ beginner (I've just started with the Web)
_____ intermediate (I've used it a little and am pretty comfortable)
_____ advanced (I've been doing it for a long time)
_____ expert (I've been doing it for a long time and I can do just about anything I need to)

46. My level of expertise in dealing with search engines on the World Wide Web is

_____ beginner (I can never find what I want)
_____ intermediate (I can usually find what I want)
_____ advanced (I can always find what I want)
_____ expert (I help others find information)

47. Discussion boards used in this online class...

_____ the message board is really hard to use
_____ the message board is hard to use
_____ the message board is sometimes hard to use
_____ the message board is easy to use

48. Direct messaging in the online class

_____ I am unable to use the direct messaging tool
_____ I always have trouble participating in direct messaging conversations
_____ I sometimes have trouble participating in direct messaging conversations
_____ I never have problems participating in direct messaging conversations

49. Verbal discussion by the teacher and other student in the online class

_____ I am unable to use the audio discussion tool
_____ I always have trouble participating in audio conversations
_____ I sometimes have trouble participating in audio conversations
_____ I never have problems participating in direct audio conversations

50. My typing speed is

_____ Slow. I have trouble keeping up (less than 20 words per minute).
_____ Ok. I have some trouble keeping up (more than 20 but less than 40 words per minute)
_____ Good. I have no trouble keeping up (more than 40 but less than 60 words per minute)
_____ Excellent. I have trouble with people keeping up with me (over 60 words per minute)

51. My typing accuracy is

_____ Dreadful. I spend more time correcting errors than typing new words.
_____ Ok. I spend a lot of time correcting my errors.
_____ Good. I spend only a little time correcting my errors.
_____ Excellent. I have few errors

Section VII – Opinion

52. How would you rate your knowledge of the subject matter before taking this course on a scale of 1 to 7?

1 2 3 4 5 6 7

53. How would you rate your access to a computer and electronic communication software on a scale of 1 to 7? Scale your answers from 1 (You Cannot Access These Items) to 7 (These Items Are Readily Accessible).

1 2 3 4 5 6 7

54. How would you rate your skill level for using resources such as e-mail and WWW resources on a scale of 1 to 7? Scale your answer from 1 (Not At All Strong) to 7 (Extremely Strong).

1 2 3 4 5 6 7

55. How frequently do you use learning resources resident on the Internet (such as WWW) or CD-ROM to access information other than in-class lecture or assigned readings? Scale your answer from 1 (Never Used) to 7 (Very Frequently Used).

1 2 3 4 5 6 7

56. How much do you think you have learned from this course so far on a scale of 1 to 7? Scale your answers from 1 (Nothing) to 7 (A Great Deal).

1 2 3 4 5 6 7

57. OVERALL, how would rate your satisfaction with this particular course so far on a scale of 1 to 7? Scale your answers from 1(Extremely Dissatisfied) to 7 (Extremely Satisfied).

1 2 3 4 5 6 7

58. OVERALL, how would rate your satisfaction with online education in general on a scale of 1 to 7? Scale your answers from 1 (Extremely Dissatisfied) to 7 (Extremely Satisfied).

1 2 3 4 5 6 7

59. Gender

Female Male

60. Student Status

9^{th} 10^{th} 11^{th} 12th

61. Age

13 14 15 16 17 18 19 Other: _____

62. Number of online courses you completed before taking this one

1 2 3 4 5 More than 5

Appendix M

High School Internet Education Survey

This survey is designed for high school students who are interested in Internet-based distance education. Please answer the following questions as accurately as you can.

DIRECTIONS: Circle the number to indicate how much you agree or disagree with each statement below. Strongly Agree is a "1? and Strongly Disagree is a "7."

1. I am a competent person in my schoolwork.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

2. I believe that I am a valuable person.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

3. I try to achieve in all my classes, regardless of their level of difficulty.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

4. I am well prepared for my schoolwork and believe that unfair tests rarely happen.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

5. I have the ability to learn new tasks.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

6. I really enjoy going to school because I like to learn.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

7. It is important that my teachers give me knowledge of results or feedback that I can use to further enhance my performance.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

8. I have a need to achieve and feel competent.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

9. Feedback is very important in helping me to attain my goals.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

10. Having control over my learning environment is important to me (i.e., choosing when to perform an activity).

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

11. I like to take risks if they are reasonable.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

12. I feel that I am a worthy individual.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

13. If I do not perform well on a test, it is probably because I did not have enough time.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

14. I enjoy going to school and learning about new ideas.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

15. I receive material rewards from my family if I attain high grades (for example, money).

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

16. I believe myself to be a very organized individual.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

17. I believe myself to be a high achiever.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

18. I frequently find myself to be very stressed, as I tend to cram too many things together at the last possible moment.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

19. I believe that luck plays a large role in anyone's success.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

20. I do not care what other people think of me if I make mistakes.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

21. I have younger brothers and sisters at home that are frequently under my care.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

22. The goals I set are often too easy.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

23. I find it easier to study for my exams at the last possible moment.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

24. As classes become harder, I feel that I have the ability to overcome many of the difficult obstacles that may present themselves.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

25. I use e-mail at least once a week.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

26. Studying for tests is often a waste of time because test questions may not be related to course work.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

27. The only reason I study hard in school is to achieve high grades.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

28. I find that I try harder if I set high goals for myself.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

29. I feel good about myself.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

30. I tend to schedule my daily activities to allow enough time to accomplish them.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

31. When something goes wrong, I usually feel that it is my own fault.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

32. I have my own e-mail account.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

33. When several demands are placed upon me, I will determine which tasks are most important and complete those first.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

34. I rarely set goals for myself.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

35. I tend to persist at tasks until they are accomplished.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

36. I have good word processing skills.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

37. When I have a difficult exam coming up, I tend to start studying a week or two ahead of time.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

38. If I am unsure what to do in a situation, I will frequently wait for someone to give me advice.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

39. I know how to use a browser to locate Internet sites.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

40. I have the ability to achieve in all of my courses.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

41. If I am unsure of what to do in a situation, I tend to wait for instructions rather than go ahead.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

42. Planning too far ahead is not smart because many things are a matter of timing or luck.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

43. When I plan activities, I can almost always make them work.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

44. If I make a mistake, I will often blame others.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

45. If I miss questions on a test, it is usually the teacher's fault.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

46. I have a computer in my home.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

47. I study hard for all of my classes because I enjoy acquiring new knowledge.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

48. Personal contact with my classmates is important to me.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

49. I am afraid of failure.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

50. Face-to-face interaction with my teachers is important to me.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

51. I believe myself to be a task-oriented person.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

52. I am more comfortable working on class projects in small groups than I am alone.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

53. I like taking chances and performing risky tasks.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

54. When working with others on projects, I frequently find myself doing everything to ensure it is done properly.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

55. It is difficult to say “no” to the requests of other persons.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

56. I take responsibility for my actions most of the time.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

57. If I am given a task to perform that I know little about, I don’t mind taking a chance.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

58. If I do not perform well on a test, it is probably because I did not get good instruction from the teacher.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

59. I find it easier to study for an important test by breaking it into sub-parts rather than studying the whole subject matter at one time.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

60. If I do not perform a task well, it is probably because it is too difficult.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

61. I will often set short-term goals to help me reach a long-term goal.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

62. Many times, the goals I set are too difficult to reach.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

63. I strive to achieve higher grades only for recognition (e.g., to be in National Honor Society).

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

64. Many times, I lose interest in attaining the goals I set.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

65. I feel motivated to perform well in my classes because of the approval I receive from other individuals.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

66. I feel comfortable using a computer.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

67. I have easy access to a computer with Internet capability.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

68. I feel that I am a very self-directed individual (a self-starter).

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

69. Having control over the pace of learning an activity is important to me (i.e., the time I take to complete an activity).

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

70. When I perform well on tasks, it is usually due to my own efforts.

Strongly Agree 1 2 3 4 5 6 7 Strongly Disagree

Information About You — Please circle the appropriate answer for each of the following and fill in information, where necessary:

71. What is your age?

a. 13 b. 14 c. 15 d. 16 e. 17 f. 18 g. 19 h. Other: _____

72. What is your gender?

a. male b. female

73. What is your favorite topic in school?

a. Art
b. Computer science
c. English/language arts
d. Foreign languages
e. Humanities
f. Mathematics
g. Music
h. Physical education
i. Science
j. Social studies
k. Technology education
l. Other: _____

74. What is your grade level?

a. 9^{th} b. 10^{th} c. 11^{th} d. 12th

75. Circle the number of clubs and organizations in which are a member or officer. (If none, leave blank.)

a. 1 b. 2 c. 3 d. 4 e. 5 f. More than 5

76. Do you have a part-time job? (If none, leave blank.)

a. No b. Yes How many hours a week do you work? _____

77. How many hours a week do you spend in activities other than a job outside school? (If none, leave blank.)

a. 1-5 b. 6-10 c. 11-15 d. 16-20 e. More than 20

78. Do you have commitments (e.g., family) outside of school, work, and clubs/organizations?

a. No b. Yes Explain _____

79. Is the course you are taking now your FIRST Internet course?

a. No b. Yes

Appendix N

Name: _____

Learning Styles Inventories

The following package contains four different activities to determine the different types of learning styles that you possess as a student. Please write your name in the space above and complete these four activities. Each student will be provided with a summary of their individual learning profile.

Activity One

There are nine sets of four words listed below. Rank order the words in each set by assigning a 4 to the word which *best* characterizes your learning style, a 3 to the word which next best characterizes your learning style, a 2 to the next most characteristic word, and a 1 to the word which is *least* characteristic of you as a learner.

You may find it difficult to choose words that best characterize your learning style. Nevertheless, keep in mind that there are no right or wrong answers - all the choices are equally acceptable. The aim of the inventory is to describe how you learn, not evaluate your learning ability. Be sure to assign a different rank to each of the four words in each set; do not make ties by using the same number twice.

4 … Best Characterizes
3 … Next Best
2 … Next Best
1 … Least Characterizes

	I	II	III	IV
1.	___discriminating	___cautious	___involved	___practical
2.	___receptive	___relevant	___analytical	___impartial
3.	___feeling	___watching	___thinking	___doing
4.	___accepting	___risk-taker	___evaluative	___aware
5.	___perspective	___productive	___reasonable	___questioning
6.	___abstract	___observing	___real	___active
7.	___present-oriented	___reflecting	___future-oriented	___practical
8.	___experience	___observation	___theoretical	___experimentation
9.	___intense	___reserved	___rational	___responsible

The four columns (I, II, III, IV) of words correspond to the four learning styles scale: CE, RO, AC, and AE. To computer your scale scores, write your rank numbers in the boxes below *only for the designated items.* For example, in the third column (III), you would fill in the rank numbers you have assigned to items 2, 3, 4, 5, 8 and 9. Compute your scale scores by adding the rank numbers for each set below.

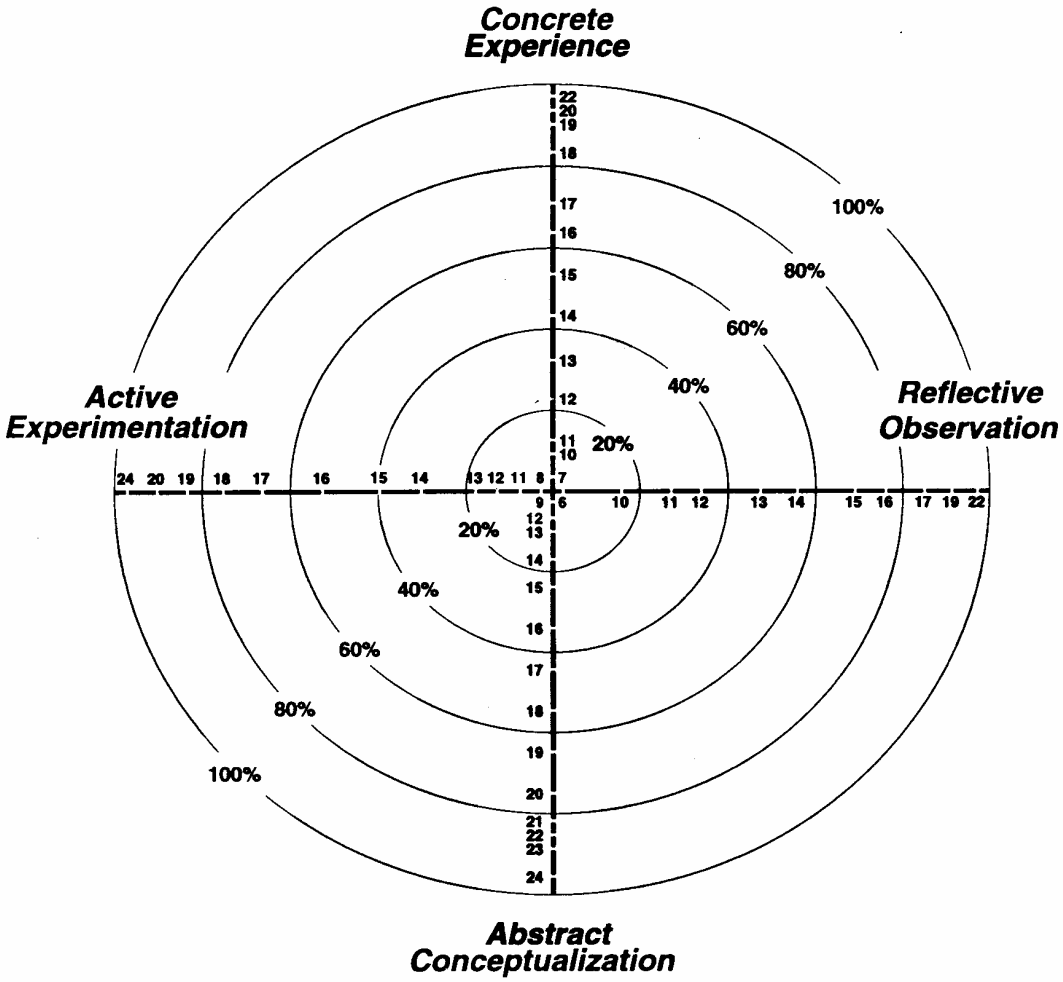
	I / CE	II / RO	III / AC	IV / AE
	2. _____	1. _____	2. _____	1. _____
	3. _____	3. _____	3. _____	3. _____
	4. _____	6. _____	4. _____	6. _____
	5. _____	7. _____	5. _____	7. _____
	7. _____	8. _____	8. _____	8. _____
	8. _____	9. _____	9. _____	9. _____
Total	_____	_____	_____	_____

1. Take the numerical scores for each of the following and transfer them to the target. Mark each score on the appropriate axis:

CE = Concrete Experience
RO = Reflective Observation
AC = Abstract Conceptualization
AE = Active Experimentation

Learning Style Profile

Norms for The Learning Style Inventory



2. Connect your scores to form a kite.

3. Shade the area inside of your kite.

Activity Two

Circle the answers that best apply to you. Remember there are no right or wrong answers in this quiz.	Seldom	Sometimes	Often
1. I remember information better from lectures with explanations and discussions.	1	2	3
2. I learn information more easily if it is written on the board	1	2	3
3. I like to take notes and write down the information I read.	1	2	3
4. I enjoy the use of posters and models in the classroom.	1	2	3
5. I need verbal explanations of diagrams and graphs.	1	2	3
6. I enjoy working with my hands.	1	2	3
7. I enjoy making graphs and charts.	1	2	3
8. I am able to tell if sounds match when presented with pairs of sounds.	1	2	3
9. I remember best by writing things down several times.	1	2	3
10. I can follow directions on maps.	1	2	3
11. I do better at academic subjects by listening to lectures and tapes.	1	2	3
12. I like to play with coins, keys, pens or other objects when learning.	1	2	3
13. I learn to spell better by repeating the words out loud than by writing them down.	1	2	3
14. I understand a news item better by reading the newspaper than by listening to the radio.	1	2	3
15. I chew gum or snack when I study.	1	2	3
16. I feel the best way to remember something is to picture it in my head.	1	2	3
17. I learn how something works by taking it apart and putting it back together.	1	2	3
18. I would rather listen to a lecture than read the material in a textbook.	1	2	3
19. I am good at solving a jigsaw puzzle and mazes.	1	2	3
20. I grip objects in my hands while learning.	1	2	3
21. I prefer listening to the news on the radio than reading about it in the newspaper.	1	2	3
22. I prefer to get information by reading about it.	1	2	3
23. I enjoy classes with physical activity and movement.	1	2	3
24. I follow verbal directions better than written ones.	1	2	3

Each of the numbers below corresponds to a statement from **Activity Two**. In the space provided next to each number, write the number that you circled for that statement in Activity Two. When you're done, add up the points in each column.

2. _____	1. _____	4. _____
3. _____	5. _____	6. _____
7. _____	8. _____	9. _____
10. _____	11. _____	12. _____
14. _____	13. _____	15. _____
16. _____	18. _____	17. _____
19. _____	21. _____	20. _____
22. _____	24. _____	23. _____
Total _____	_____	_____

Activity Three

Complete each section by placing a "1" next to each statement you feel accurately describes you. If you do not identify with a statement, leave the space provided blank. Then total the column in each section.

Section 1
_____ I enjoy categorizing things by common traits
_____ Environmental issues are important to me
_____ Hiking and camping are enjoyable activities
_____ I enjoy working on a garden
_____ I believe preserving our National Parks is important
_____ Putting things in hierarchies makes sense to me
_____ Animals are important in my life
_____ My home has a recycling system in place
_____ I enjoy studying biology, botany and/or zoology
_____ I spend a great deal of time outdoors

_____ TOTAL for Section 1

Section 2
_____ I easily pick up on patterns
_____ I focus in on noise and sounds
_____ Moving to a beat is easy for me
_____ I've always been interested in playing an instrument
_____ The cadence of poetry intrigues me
_____ I remember things by putting them in a rhyme
_____ Concentration is difficult while listening to a radio or television
_____ I enjoy many kinds of music
_____ Musicals are more interesting than dramatic plays
_____ Remembering song lyrics is easy for me

_____ TOTAL for Section 2

Section 3
_____ I keep my things neat and orderly
_____ Step-by-step directions are a big help
_____ Solving problems comes easily to me
_____ I get easily frustrated with disorganized people
_____ I can complete calculations quickly in my head
_____ Puzzles requiring reasoning are fun
_____ I can't begin an assignment until all my questions are answered
_____ Structure helps me be successful
_____ I find working on a computer spreadsheet or database rewarding
_____ Things have to make sense to me or I am dissatisfied

_____ TOTAL for Section 3

Section 4
_____ It is important to see my role in the "big picture" of things
_____ I enjoy discussing questions about life
_____ Religion is important to me
_____ I enjoy viewing art masterpieces
_____ Relaxation and meditation exercises are rewarding
_____ I like visiting breathtaking sites in nature
_____ I enjoy reading ancient and modern philosophers
_____ Learning new things is easier when I understand their value
_____ I wonder if there are other forms of intelligent life in the universe
_____ Studying history and ancient culture helps give me perspective

_____ TOTAL for Section 4

Section 5
_____ I learn best interacting with others
_____ The more the merrier
_____ Study groups are very productive for me
_____ I enjoy chat rooms
_____ Participating in politics is important
_____ Television and radio talk shows are enjoyable
_____ I am a “team player”
_____ I dislike working alone
_____ Clubs and extracurricular activities are fun
_____ I pay attention to social issues and causes

_____ TOTAL for Section 5

Section 6
_____ I enjoy making things with my hands
_____ Sitting still for long periods of time is difficult for me
_____ I enjoy outdoor games and sports
_____ I value non-verbal communication such as sign language
_____ A fit body is important for a fit mind
_____ Arts and crafts are enjoyable pastimes
_____ Expression through dance is beautiful
_____ I like working with tools
_____ I live an active lifestyle
_____ I learn by doing

_____ TOTAL for Section 6

Section 7
_____ I enjoy reading all kinds of materials
_____ Taking notes helps me remember and understand
_____ I faithfully contact friends through letters and/or e-mail
_____ It is easy for me to explain my ideas to others
_____ I keep a journal
_____ Word puzzles like crosswords and jumbles are fun
_____ I write for pleasure
_____ I enjoy playing with words like puns, anagrams and spoonerisms
_____ Foreign languages interest me
_____ Debates and public speaking are activities I like to participate in

_____ TOTAL for Section 7

Section 8
_____ I am keenly aware of my moral beliefs
_____ I learn best when I have an emotional attachment to the subject
_____ Fairness is important to me
_____ My attitude effects how I learn
_____ Social justice issues concern me
_____ Working alone can be just as productive as working in a group
_____ I need to know why I should do something before I agree to do it
_____ When I believe in something I will give 100% effort to it
_____ I like to be involved in causes that help others
_____ I am willing to protest or sign a petition to right a wrong

_____ TOTAL for Section 8

Section 9
_____ I can imagine ideas in my mind
_____ Rearranging a room is fun for me
_____ I enjoy creating art using varied media
_____ I remember well using graphic organizers
_____ Performance art can be very gratifying
_____ Spreadsheets are great for making charts, graphs and tables
_____ Three dimensional puzzles bring me much enjoyment
_____ Music videos are very stimulating
_____ I can recall things in mental pictures
_____ I am good at reading maps and blueprints

_____ TOTAL for Section 9

Now carry forward your total from each section and multiply by 10 below:

Section	Total Forward	Multiply	Score
1		X 10	
2		X 10	
3		X 10	
4		X 10	
5		X 10	
6		X 10	
7		X 10	
8		X 10	
9		X 10	

Activity Four

Using the scale below, circle the answers that best apply to you. Remember there are no right or wrong answers in this quiz.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

1. I like to think things out rationally and carefully.

1 2 3 4 5

2. In learning, I value careful and logical thinking.

1 2 3 4 5

3. I enjoy thinking through difficult things and making wise decisions

1 2 3 4 5

4. I think seriously and think back on what I learn.

1 2 3 4 5

5. I enjoy putting together new ideas and thoughts.

1 2 3 4 5

6. I like hearing about new ideas and facts.

1 2 3 4 5

7. Actually doing things is my preferred way of learning.

1 2 3 4 5

8. I learn more through actual experience and practice with a subject.

1 2 3 4 5

9. I prefer learning actual practices, not theories.

1 2 3 4 5

10. I enjoy doing experiments to see how things work.

1 2 3 4 5

11. I learn well from practical and useful activities.

1 2 3 4 5

12. I learn things well when I'm emotionally involved and excited.

1 2 3 4 5

13. I learn well by watching what others do.

1 2 3 4 5

14. Observing is a good way for me to learn.

1 2 3 4 5

15. I enjoy taking notes and writing down facts I learn.

1 2 3 4 5

16. I like to look at things in detail, breaking them down into separate parts.

1 2 3 4 5

17. I usually accept things I learn without questioning them.

1 2 3 4 5

18. I learn best when I listen quietly rather than speaking up in class.

1 2 3 4 5

19. I think mainly about today, not tomorrow.

1 2 3 4 5

20. In many learning situations I feel unsure and uncertain.

1 2 3 4 5

21. I quickly understand things I learn, almost by intuition.

1 2 3 4 5

Appendix O

Your Online Learning Experiences Survey

This survey will investigate the characteristics of online learning experiences. This survey should only be completed by those students who have completed at least one online course. Your feedback is sincerely appreciated. Thank you. Check the most appropriate response for the following questions.

1. How many web-based courses have you completed? _____

2. Were you satisfied with all of your experiences in these web-based courses?

very dissatisfaction		equally satisfaction		very satisfaction
1	2	3	4	5

3. How difficult were your web-based courses in general compared to face-to-face course?

less difficult		equally difficult		more difficult
1	2	3	4	5

4. Are you satisfied with your experience in these web-based courses as compared to learning in a face-to-face course?

less satisfied		equally satisfied		more satisfied
1	2	3	4	5

5. Which of the following technologies did you use while of taking web-based courses? Circle all that apply.

E-mail	Chat	Discussion Forums	Interactive Items
Audio Clips	Video Clips	File Transfer Protocol (FTP)	Virtual Classroom (e.g., eLive)

6. How did the following tools help you in your web-based courses? Circle the most appropriate response.

Internet Tool	**Never**		**Sometimes**		**Very Often**
E-mail	1	2	3	4	5
Chat	1	2	3	4	5
Discussion Forums	1	2	3	4	5
Interactive Items	1	2	3	4	5
Audio Clips	1	2	3	4	5
Video Clips	1	2	3	4	5
File Transfer Protocol (FTP)	1	2	3	4	5
Virtual Classroom (e.g., eLive)	1	2	3	4	5

7. Which of the following Internet tools did you find challenging in your web-based studies? Circle all that apply.

E-mail	Chat	Discussion Forums	Interactive Items
Audio Clips	Video Clips	File Transfer Protocol (FTP)	Virtual Classroom (e.g., eLive)

8. What problems have you encountered while taking web-based courses? Check all that apply.

__ lack of adequate Internet knowledge
__ can't find the information I need in order to be successful
__ lack of time
__ technical problems
__ lack of sense of community
__ difficulty understanding goals/objectives of the course
__ other (please list as many as applicable):_____

9. Why did you decide to take an online course? Check all that apply.

__ convenience (I don't have to travel to school)
__ this is the only way it is offered
__ I wanted to try a web-based course
__ a required course
__ other

10. How did you learn about your web-based course?

__ from the class schedule
__ from an instructor
__ from a friend
__ other (how?) _____

11. Overall, I am satisfied with taking web-based courses.

__ Yes
__ No

12. Which factors are important for success in a web-based course? Circle the appropriate response.

Factor	**Not Important**	**Somewhat Important**	**Important**	**Very Important**
Clear objectives	1	2	3	4
Well-organized content	1	2	3	4
Exercises	1	2	3	4
Quizzes	1	2	3	4
Tutor Feedback	1	2	3	4
Motivation of the student	1	2	3	4
Time management of the student	1	2	3	4
Technology comfort level	1	2	3	4

13. Where do you access the Internet?

__School __Home __Friend's home	__Library (public or university) __Internet café __Other (please list): _____

14. How many hours did you spend on your online courses over the period of a week (seven days)?

__Less than 2 hours
__3-6 hours
__7-10 hours
__11-14 hours
__More than 15 hours

15. What is your gender?

__ Female
__ Male

16. What is your grade?

__ Level I
__ Level II
__ Level III
__ Level IV

17. What is your age?

__ 15
__ 16
__ 17
__ 18
__ 19
__ Over 19

Appendix P

Code	ID	Q#	Turn#	Data	Notes
13002	PS4	5	232.	we just works on the same one and compares the answers	
13002	PS4	5	244.	lately we been having the more often, where we got like, where we missed a couple of classes and where we're doing assignments and homework, both things and stuff like that	
13002	PS4	5	247.	for both classes I'd say at least four or five, six times a month	
13002	PS4	5	250.	probably once a week	
13002	PS4	5	253.	sometimes twice a week	
13002	PS4	5	256.	we has more like, in physics we'll probably have two assignments per chapter or whatever, or unit, so I we gets together more for physics	
13002	MG4	5	227.	I'd say about once every three weeks or something	
13002	MG4	5	230.	Just when an assignment or something like that gets up	
13002	JuS4	5	173.	Every single time we have an assignment	
13002	JuS4	5	176.	probably the average is once every couple of weeks	
13004	PS4	5	259.	it's not strictly like that, it's just, you know, we talk about other stuff too	
13005	JH4	5	206.	I'd say it's about fifty percent about the assignment	
13005	PS4	5	262.	I don't know, around about sixty I would say	
13005	MG4	5	220.	forty percent	
13005	JuS3	10	439.	probably sixty-five other stuff.	
13005	JuS3	10	168.	I'd say around sixty-five percent other stuff	
13006	PS4	5	228.	helps each other and, like, we works on the same problem just like, you know, and if either one of us got like a problem, we just asks and, you know, just helps each other along	
13006	PS4	5	233.	we just works on the same one and compares the answers	

Codebook

1000 – Personal
- 1001 – age/grade
- 1002 – courses
- 1003 – home access
- 1004 – educational experience
- 1005 – teaching experience

2000 – School
- 2001 – description
- 2002 - supervision

3000 – Online
- 3001 – instruction
- 3002 – on-task
- 3003 – off-task
- 3004 – interaction
- 3005 – taking notes
- 3006 – conversation

4000 – Offline
- 4001 – instruction
- 4002 – on-task
- 4003 – off-task
- 4004 – interaction
- 4005 – conversation
- 4006 – collaboration
- 4007 – workspace
- 4008 – taking notes

5000 – Support
- 5001 – e-teacher
- 5002 – in-school teacher
- 5003 – classmates
- 5004 – eLive
- 5005 – WebCT
- 5006 – textbook
- 5007 – notes
- 5008 – e-tutors
- 5009 – MLOs
- 5010 – WWW
- 5011 – online classmates
- 5012 – in-school tutors
- 5013 – technical
- 5014 – evening sessions
- 5015 – co-curricular activities

6000 – Characteristics

7000 – Success

8000 – Missing class
- 8001 – mandatory activities
- 8002 – voluntary activities
- 8003 – making up work

9000 – Workload
- 9001 – online
- 9002 – classroom
- 9003 – homework

10000 – Community
- 10001 – in-school
- 10002 – online
- 10003 – e-teacher
- 10004 – online students

11000 – Perceptions
- 11001 – benefits
- 11002 – challenges
- 11003 – classroom comparisons
- 11004 – technical problems

12000 – Web-based Design

13000 – Evening Sessions
- 13001 – description
- 13002 – frequency
- 13003 – on-task
- 13004 – off-task
- 13005 – conversation
- 13006 – collaboration

Appendix Q

Norah. Striking in her appearance, both because of her physical stature and in her infectious personality – you always knew when Norah was in the room. Somewhat boisterous, compared to many of the other girls both involved in the CDLI courses and within the school, she came from a family of six. A grade 11 student enrolled in a mathematics course and a science course, Norah had also completed a language arts course the previous year.

Norah was one of two students that I had the least contact with throughout this study, as she did not participate in the interview portion of this study. However, during my time at Beaches All Grade, she was one of the more social and personable students, often chatting with me before and after class, during recess, or after school. Norah was serious about her studies but also exhibited characteristics commonly expected from a typical teenager. During class, particularly her asynchronous periods, she was just as likely to sit around and chat or join the older grade 12 students in the gymnasium as they decorated for graduation than she was to actually do her work. However, Norah recognized that "You have to do the work, you can do it in school or you can do it at home, but it has to be done!"

During this past school year, Norah's family purchased a new computer (complete with Internet access) which Norah used at home. She said her old computer was able to access most of the *WebCT* but was not fast enough for her to use *Elluminate Live.* However, Norah's new computer gave her access to the software needed for her CDLI courses. While Norah had to share the computer with her family, as she put it "usually if I need the computer I can get to the computer when I need it."

Dayna. The quote next to Dayna in the school's graduation book read, "I'd rather be hated for who I am, than be loved for who I'm not." Unfortunately I did not get to know Dayna that well through the course of this study. Over the winter she struggled with a personal relationship that caused her to discontinue with the interview portion of this study after the first interview. When I arrived at Beaches All Grade, unlike Norah who I was able to get to know during my time in the school, Dayna was not as out-going or forward which made it more difficult for me to interact with her.

A grade 12 student who was enrolled in a language arts class through the CDLI, Dayna was one of the students who impressed upon me the impact that the school had made upon her. Dayna indicated that it was her fellow students and teachers at the school who helped shape her into the person that she had become. During her first interview she stated that she was "living with my grandparents, I had a little bit of trouble when I was with my parents" and one wondered if that did not have an affect on the close relationships that she formed at school.

Like Max, Dayna did not have access to a computer at home.

Darlene. Living next door to her parents with her elderly grandmother, Darlene was probably the only true digital native of the group (Dede 2005a, 2005b; Prensky, 2001). Even with only dial-up Internet access, the telephone at Darlene's grandmother's home was typically connected to the Internet. A regular user of instant messaging and her Windows Live Space (i.e., a social networking site by Microsoft similar to MySpace), Darlene had many people from around the world which she had never met that she called "friends". She used her Windows Live Space area as a way to post hundreds of pictures that she had taken with her webcam or digital camera of herself, her friends, her family,

and scenery from where she lived. She also used the blogging features of Windows Live Space to express herself, ranging from simple entries about what was going on in her life, to poetry and short stories. In her own words, "I just like sharing my work, it's the way I express myself…. I'm not known for a whole lot except for my poetry, so I just likes people reading it…. I'm known as a writer."

One of the interesting things about Darlene was if you were to meet her, you would not see this outgoing, expressive personality. Seeing her in the classroom and school corridors, this grade 12 student seemed quiet, even melancholy – which even she acknowledged, "I don't talk much, I'm loud and I laugh and I like to have fun, but I'm just quiet in school, I don't know why." The oldest student in her graduating class, Darlene shared a close relationship with her family and a small group of close friends. During the 2005-06 school year, she was enrolled in a single Language Arts course, having taken one CDLI course the previous year.

While Darlene was probably the most active Internet user of the group, she was unable to access *Elluminate Live* from her home computer. She was able to access all of the necessary components of *WebCT* and said that, "I'm always in *WebCT*, this is how I gets most of my work in."

Kevin. Kevin was a grade 12 student enrolled in one of the fine arts courses. This was Kevin's second CDLI course, having completed another fine arts course the previous year. In talking with Kevin it was obvious that he was intelligent, as his awareness of current events attested. He was not particularly well suited to a formal school environment. With ambitions to study and apprentice in a trade, he was much more at home working with his hands than he was sitting in a classroom. This was best illustrated

by how Kevin behaved in the distance education room. With a personal interest in drawing, one would have thought Kevin would have enjoyed and been more engaged in a fine arts course. However, it was not uncommon for Kevin to have spent entire classes during his asynchronous periods and even much of the class during his synchronous periods, chatting with one or more of the four grade 11 students in the distance education room at the same time taking a mathematics course (as he was also the only student enrolled in this fine arts course).

While some would have characterized Kevin as a lazy student, I argue it was the exact opposite; Kevin worked as hard as possible to do as little as possible when it came to things that he perceived as being "school" – which included participation in this study. In trying to conduct the final interview with Kevin, the principal and I decided to schedule it during Kevin's CDLI class on my final day at the school because according to the principal "he doesn't do anything during that time anyway" (he had also missed the third interview and was difficult to successfully schedule for the first two interviews). On my final day Kevin spent the first 20 minutes of class trying to convince us that he had a synchronous class that he couldn't miss even though the teacher hadn't logged in yet, then when we would leave he continued to talk to one of the students from the mathematics course (who was missing an asynchronous tutorial session with post-secondary tutor at the school). It was almost amusing that the quote next to his section of the school's graduation book read, "If at first you don't succeed, give no evidence that you tried." The one at the bottom of that page directly underneath his section read, "Hard work never killed anyone, but why take the risk?"

Kevin had a computer with Internet access in his room, which he shared with his younger brother. When asked if he had tried to access *WebCT* from home, he stated “my computer is not fast enough for that.” When asked about *Elluminate Live,* he indicated that it was “not nearly fast enough for that.”