

Actualizing Virtual Teaching

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K-12 online distance education is growing rapidly in Canada. According to Barbour (2013), approximately 25, 000 students enrolled in online distance courses during the 1999-2000 school year, while, the enrolment reached 284, 963 during 2011/12 school year. 251 programs are offering online distance courses to K-12 students in Canada. Some provinces and territories such as Ontario, British Columbia, Manitoba and Saskatchewan have more than one program, while others, such as Newfoundland and Labrador, Yukon Territories and Northern Territories rely on one program. In Newfoundland and Labrador, the Centre for Distance Learning and Innovation (CDLI) is the only institution providing equality of educational opportunities through Internet-based courses to high school students, especially from rural communities. The CDLI was established by the Department of Education in December 2000 piloting 10 Internet-based courses. Currently, the CDLI offers 40 online courses to more than 1000 high school students in the province. Virtual teaching has the potential to transform traditional teaching (Rice, 2012). Teachers use an online mode of delivery in the CDLI. Some literature has been written on virtual schooling in NL such as the evolution of online distance education (Barbour, 2005; Barbour, 2008; Boone, 2008; Mulcahy, 2007; Press, Galway & Collins, 2003; & Saqlain, 2013), the integration of technology in rural schools (Sheppard, Boone & Stevens, 2001), and the effectiveness of distance education (Crocker, 2007). Similarly, some research studies were conducted on cyber schooling such as the impact of high school online distance education on rural students' university achievement and persistence (Dodd, Kirby, Seifert & Sharpe, 2009), perceptions of distance education (Johnson, 2011), the role of on-site facilitators (Barbour & Mulcahy, 2009) and the need of change in teaching (Stevens, 2006; Stevens; 2007). Less has been said about virtual teaching through the CDLI in the province. This paper will provide its readers a broader understanding of teaching and learning through the CDLI.

Teaching and Learning

In 1988/89, a grade ten advanced mathematics course was offered to students from 13 schools through the Telemedicine Education and Technology Resource Agency (TETRA) network, located at the Health Sciences Centre, in St. John's. A telephone-based conferencing system was used to join the classes. Mics and speakers were placed in the classrooms and in the teacher's office. Everyone in the class could speak and be heard. A telewriter system was used to display the teacher's writing. The telewriter system used a large graphics tablet for input and a computer monitor for output. The teacher would write on the tablet and it would be sent to students over the teleconference network. The students could have the same capability to write, as needed during class time.

The students had the same number of classes as they would have had, were the course offered face to face. For most of the courses, half of those classes, every second period, would be an "online class" using the system and the remaining half, often called "offline classes" were times in which the students completed in-class activities. For French, typically 70% of the classes were online, though, owing to the need for frequent oral communication. A teacher could not see the

students, instead he or she could hear them and see what they were writing. One of the major advantages of the tele-teaching was that a teacher could not judge the students on the basis of physical appearance, family background and previous experience with the subject. If there was a requirement of any demo, the demo was videotaped and copies were sent to each school.

The labs were done, onsite by the students, through the latest digital interfacing equipment. Besides the regular real-time (synchronous) classes, the students also had the benefit of print resources tailored to each course. Distance education handbooks were prepared for the students. One handbook was prepared per unit of study. The students were expected to read the lesson and complete the assigned exercises. The teachers would make sure that students read the contents. Sometimes extra support would be provided to students in need. Tests and assignments were prepared a year in advance and sent to the schools. Written work of the students was faxed to the teacher and then, marked and faxed back to the students. To engage students and to make teaching more interactive, teachers would use many strategies such as using a question answer style of teaching, asking follow up questions, being a good listener, and maintaining communication with onsite administration.

In 1998/99, four advanced placement courses (Physics, Chemistry, Biology and Mathematics) were offered to students from eight schools through the Vista School Project. An early version of WebCT as well as several assorted asynchronous tools were used to deliver courses. The Learning Management System (LMS) had content management tools, student email, online testing tools, a drop box for assignment submission, a discussion forum and a grade book. Netmeeting was used as a synchronous tool. Netmeeting provided two-way voice, video, and a whiteboard. A couple of months later, MeetingPoint was also used to enable Netmeeting to connect more than one school at a time to the instructor.

In 1999 the provincial government created a ministerial review panel to reexamine various aspects of education, including Distance Education. Chapter 6 of the document "Supporting Learning" (Sparkes & Williams, 2000) contained numerous recommendations regarding Distance education, the most important of which was the creation of a "Centre for Distance learning and Innovation." This recommendation was acted upon almost immediately and in 2000 the CDLI was created. It immediately went to work planning for a pilot year in which it would field-test ten new courses.

It was decided to continue to use WebCT but the course content was created as stand-alone-web content and was imported into the LMS once completed. Templates were created for the courses and developers were seconded or contracted, provided with equipment, training and support and began creating the content, which was placed within a standard course content template. The courses were based on the standard course offerings for the province. Courses were divided into units, in accordance with the organization used in the official Curriculum Guides. If needed, Units were further subdivided into sections. The basic stand-alone course organizer, though, was the lesson, which was a portion of the course which could be completed, typically, in one to three class periods, as appropriate for the material. Each lesson was divided into five components. The content templates had five tabbed pages:

- **You Will Learn:** A list of the curriculum outcomes for the lesson but re-worded so that they would be understandable to students. Curriculum outcomes from guides are written for teachers and often contain jargon; the developers used language that students would be expected to understand.
- **You Should Already Know:** A list of items that students were expected to know before starting the lesson. This was not an effort to reteach content that was expected to be previously taught. Mostly this section listed the items and, perhaps, linked back to the lessons where they would have been addressed, if appropriate.
- **Lesson:** The actual learning content. Typically this consisted of text and graphics. In grade 11 physics, for example, the developer included objects created using Macromedia® Flash™ as well.
- **Activities:** As the name suggests, these would include additional items the student would do. In the grade 11 physics course, for example, these tended to include practice questions and problems.
- **Test Yourself:** A short self-assessment. In many of the courses, including Physics, this would be an interactive multiple choice quiz powered by an open-source Javascript engine the developers had come across.

Recruiting virtual teachers was another major challenge. First, the CDLI administrative staff created a general profile for e-teacher's characteristics. Then, an online point-based application process was used to accept applications and to see the appropriateness of the e-teachers. Teachers would be interviewed, shortlisted and three referees were contacted. Short listed candidates were rank-ordered according to the score. Then the directors would approach the school district and ask permission to appoint the highest ranked teacher for each job. One thing is noteworthy, that all the teachers had traditional teacher training.

From the CDLI side, every possible effort was made to support online learners. Each student was provided a computer and her/his own login. A disk cloning process was used to set up the computers. In this system, all the necessary software was installed and configured on one computer. Then, the disk drive was cloned to all other computers. In each school, an 'all-in-one' printer/scanner with a document feeder was also provided. Online learners were free to use it. They could print off their work and upload their handwritten assignments to the WebCT drop box. For synchronous classes, each computer was equipped with a graphics tablet. Each student was provided his/her own headset-microphone. For the science labs, digital interfacing equipment such as Vernier LabPro with Logger Pro software was used.

Online learning cannot gain success without onsite teacher support. At the school level, online students are supported and supervised by a mediating team (m-team) or a mediating teacher (m-teacher). M-teachers choose these responsibilities voluntarily or they are assigned these responsibilities besides their usual work. Principals select and register students for online courses. They make sure that there is an appropriate place for online students to work at the school. They also liaison with the CDLI about the latest updates. M-teachers supervise tests and

labs, communicate with the e-teacher and make sure that students are on task. Peers provide basic training to their fellows. Technical issues are solved by the district technician with the support of the M-teacher.

Many readers are eager to know about labs in the CDLI. Before the Internet in 1992, the handbooks, with technical assistance, were written. The slides were used on the telewriter. Each student was given a handbook with detailed instructions. Each school was also provided with VHS videos with demos for each unit. Schools were expected to provide the traditional lab equipment to the students and the Department of Education provided, free of charge, kits containing the necessary digital interfacing hardware and software as well as a computer. Students were expected to do the labs under the onsite teacher's supervision. Students were encouraged to work in groups. It was made sure that the students had adequate supervision for their labs at school. Teacher also visited the sites as needed and assisted students. The system used today by the CDLI is a variation on this. Schools are still expected to provide the traditional equipment and the interfacing equipment is all provided by the CDLI. The detailed instructions are still present but are now embedded within the learning content in Desire2Learn. As always, students are expected to perform the lab activities at their own schools, under the supervision of a member of the M-team. The CDLI also has personnel dedicated to the support of the lab activities. Lab support works in cooperation with the online teachers and provides assistance, as needed, both onsite as well as virtually through videoconference.

The growth of virtual schooling is rapid. To be sure the advancement in virtual schooling in Canada is less than the United States. But it is more than in any other country around the world. Barbour (2013) mentions that 5.2% of the total K-12 population take online courses in Canada. Due to the expansion of the Internet, decrease in prices of software and hardware, and different learners' needs, virtual schooling may continue to increase. In the Newfoundland and Labrador context, mainly rural students in smaller schools take online courses with the CDLI. The Government of Newfoundland and Labrador (2013) anticipates that there will be over 70,000 job openings in the province by 2020. It is expected that most of the professionals who will move to Newfoundland and Labrador will bring their families. It follows that many urban students will also start taking online courses as it is happening in the US and in some other provinces of Canada. It is time to think, are we ready to teach the twenty first century skills to our learners? Many universities in the US are offering teacher training in virtual learning environments. Some free introductory courses such as Foundation of Virtual Instruction, Emerging trends and Technologies in the Virtual K-12 Classroom, Advanced Instructional Strategies in Virtual Classroom are offered by the University of California, Irvine through massive open online courses (MOOCs).

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