
New Systemic Roles Facilitating the Integration of Face-to-Face and Virtual Learning

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Abstract

The introduction of web-based education in Canadian schools, as in other developed countries, has been particularly noticeable in rural areas. Small schools in rural communities have continued to get smaller as families relocate in urban areas in search of increased educational and vocational opportunities. There are a number of issues common to the technological enhancement of rural schools: the building of appropriate infrastructures, the implementation of information and communication technologies and the development of pedagogy for web-based education. In the Canadian province of Newfoundland and Labrador a number of new positions and roles have been created to distribute responsibilities for these issues and to ensure the success of virtual schooling.

Newfoundland and Labrador

Newfoundland and Labrador is the eastern-most province of Canada and is situated on the North Atlantic Ocean west of Greenland and north of the United States. The province consists of a large, roughly triangular island (108,600 square kilometers), an irregularly-shaped mainland territory (294,300 square kilometers), and over seven thousand smaller islands (3,598 square kilometers). The climate ranges from temperate to arctic and the terrain ranges from gently rolling hills to mountainous. The major exports of the province are iron ore, petroleum, hydropower, fish, and people. Historically, the fishing industries drew people to Newfoundland and Labrador from Great Britain, France, Portugal and Spain; however, the trend in the 20th century was out-migration to other Canadian provinces and the United States in search of employment. Recently, there has also been a significant population migration inside the province to larger communities and especially to St. John's, the capital city, which has a metropolitan population of approximately 200,000.

Education in Rural Newfoundland and Labrador

In Newfoundland and Labrador the introduction of web-based education is centered on small schools in rural communities for whom recent technological developments offer not just new teaching and learning opportunities but a life-line for their continued existence. Meeting the needs of students located in rural communities has required special consideration in the development of new, electronic educational structures.

Table 1

Number of Schools By School District 2000-01 to 2005-06

School District	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Labrador	19	19	19	16	16	16
Western	92	89	85	82	82	79
Nova Central	80	79	79	75	75	70
Eastern	140	134	129	127	125	124
Conseil scolaire francophone provincial	6	5	5	5	5	5
Total	337	326	317	305	303	294

Department of Education of Newfoundland and Labrador (2006) *Education Statistics – Elementary - Secondary 2005-2006 School Information*

Declining enrolments in rural schools presents particular administrative issues in the province of Newfoundland and Labrador and has twice led to the re-organization of school districts from 27 in 1997 to 11 in 1998 to 5 in 2004. The above table shows that in all school districts in Newfoundland and Labrador, the number of schools is declining. With the exception of the Eastern school district, in which the capital city of St John's is located, most schools in other parts of the province are located in communities with populations of 5,000 or less. For example, in the communities of Gaultois, McCallum and Hermitage, located in Hermitage Bay on the south coast of the Island of Newfoundland, school populations have declined by 50-60% since the 1998-1999 school year (Furey, 2008). Declines in school district student populations are illustrated in the following table:

Table 2

Urban and Rural Enrolment and Schools by School District 2005-06

Social District	Urban				Rural				Total Schools	Total Enrolment
	Schools	% Schools	Enrolment	% Enrolment	Schools	% Schools	Enrolment	% Enrolment		
Labrador	6	37.5	2,968	68.7	10	62.5	1,351	31.3	16	4,319
Western	15	19.0	5,685	39.7	64	81.0	8,624	60.3	79	14,309
Nova Central	12	17.1	4,766	34.0	58	82.9	9,246	66.0	70	14,012
Eastern	66	53.2	30,789	70.1	58	46.8	13,131	29.9	124	43,920
Conseil scolaire francophone provincial	3	60.0	83	40.9	2	40.0	120	59.1	6	203
Province	102	34.7	44,291	57.7	192	65.3	32,472	42.3	294	76,763

Department of Education of Newfoundland and Labrador (2006) *Education Statistics – Elementary - Secondary 2005-2006 School Information*

The Development of e-Learning in Newfoundland and Labrador

With most schools in the province being in rural communities and declining in size, there is an administrative problem of providing educational opportunities that are comparable to those available in larger institutions in urban Newfoundland and Labrador. This issue was first identified by Riggs (1987) in the provincial government *Report of the Small Schools Study Project*. The search for an appropriate educational structure for the delivery of education to rural students in the late 1980s led to the Telemedicine system, later renamed TETRA (Telemedicine and Educational Technologies Resources Agency) being chosen. Although this teleconferencing system was initially designed for the training and use of medical professionals in the province, it was used successfully between 1988 and 2001 as the sole mechanism for high school distance education. By 2001, provincial TETRA course enrolments had risen to 895 representing 706 students in 11 high school courses taught by 27 full- and part-time teachers (Brown, Sheppard & Stevens 2001). Course selection included advanced math, physics, chemistry and French language instruction.

During the mid-1990s, as the Internet and web-based technologies developed, regional and national educational networks were established in Canada. In 1993, STEM~Net, the Student and Teacher Educational Media Network, was established in Newfoundland and Labrador and became one of the founding organizations of the federal School-Net Network (Weir, 1995). These electronic structures enable teachers to extend the curriculum available to learners in dispersed and, often, very isolated sites. Many primary and elementary school students participated in web-based projects sponsored by these networks and developed information, communication, and technology skills which they would later use as high school students in web-based

courses. STEM~Net no longer exists but was the primary infrastructural building block of past and current educational networks in the province (Furey, 2007).

In the late 1990s, some school districts organized alternative, web-based virtual classes to take advantage of new and emergent technologies and offer students an alternative form of distance education. The Vista School District, one of eleven provincial school districts, was comprised of 5165 students, 366 teachers and 18 schools in 1998 when a five-year strategic plan was launched that led to the creation of the Vista Digital Intranet (VDI). The Department of Education report entitled, *A Partnership Model for Distance Education in Newfoundland and Labrador*, endorsed “advanced placement” courses as an integral component of the senior high school program. In partnership with the Centre for TeleLearning and Rural Education in the Faculty of Education at Memorial University of Newfoundland, the Vista School District began to develop web-based advanced placement courses in mathematics, physics, biology and chemistry (Stevens, 2000). Courses consisted of synchronous student-teacher interaction through voice-over-internet protocol (VOIP), direct messaging, virtual white boards, and asynchronous WebCT-based curriculum activities and resources. During the 1998-99 school year an extensive pilot was delivered to eight schools and a significant number of students in their graduating year.

The success of the VDI attracted the attention of other school districts with similar identified needs and by the 1999-2000 school year the delivery of advanced placement instruction via the intranet had expanded to five provincial school districts. In 2000 a report commissioned by the Department of Education entitled *Supporting Learning: Ministerial Panel on Educational Delivery in the Classroom* recommended the creation of a provincial intranet to provide all rural students with curriculum programming equity through web-based instruction. The Centre for Distance Learning & Innovation (CDLI) was founded in December 2000 and, after a development year and a pilot year, became the sole delivery mechanism for high school distance education in 2003-2004. By that year 97 of 139 (70%) schools offering the provincial high school program were connected to the CDLI intranet using a variety of technologies – 81 schools were connected through frame relay, 11 schools through two-way satellite, 3 through cable/DSL, and 2 through wireless technologies. Courses were offered to students, including art, economics, geography, history, music, technology and writing in addition to the original advanced placement subjects of mathematics, physics, chemistry and French. During the 2006-2007 school year, CDLI had expanded the number of course offerings to 35, many in multiple slots, the number of enrollments to 1800, the number of client schools to 106, and had hired a full-time on-line guidance counselor (Furey, 2007). CDLI web-based courses are also available to every high school student and teacher working in face-to-face classrooms in the province as a learning resource.

Opening Minds and Structures

Educators and students have demonstrated that the most powerful feature of the Internet is that it allows people to communicate with one another from multiple sites (Picciano, 2006). The potential applications for rural schools are being actively explored in Canada and in many other parts of the world at the present time (Stevens & Stewart, 2005). In remote classrooms in Canada, the Internet is a “window” into non-local environments rich in information about distant countries, people, and their ideas and customs (Haughey & Muirhead, 2004). As teachers and students participate in Internet activities and join online communities,

they become exposed to different beliefs and values (Weller, 2006).

However, the Internet allows the user to open the door in both directions. Through the creation of web-based resources, rural school teachers and students invite people located anywhere in the world to visit rural Canada and learn about the activities and interests of their communities. Students and teachers, even in the most remote communities, as long as they are connected, benefit from globalization and “the end of geography” (Dabbagh & Bannan-Ritland, 2005). In speaking to local teachers, we have learned that this “National Geographic effect” sometimes translates into a local appreciation by students of the uniqueness and value of their own culture.

However, the Internet and web-based distance education courses are doing more than broadening perspectives on education; they are encouraging educators to re-examine their understanding of educational systems (Blomeyer & Dawson, 2005). Moore and Kearsley (2005) suggest that “the administration of a distance education program includes all the major events and activities that support any formal education process” (p. 191). They have described a model for distance education based on aspects of educational organization, program and course design, course delivery, student-teacher interaction, and the learning environment. However, the resources, personnel, controls and policies required to implement and institutionalize effective distance education do not exist in a vacuum but within the frameworks of larger educational systems.

In the province of Newfoundland and Labrador, participating institutions academically and administratively interface for that part of the school day during which classes are being taught (Stevens, 1999, 2000). Each local school becomes an inter-dependent part of a virtual school, without which they could not provide all the courses their students desire, and in many instances require, as part of their high school program.

However, there is a potential conflict between a school as an autonomous educational institution serving a designated district and schools which become, in effect, sites within electronic teaching and learning networks. In a case study of the impact of the implementation of virtual schooling on local schools in Hermitage Bay, Newfoundland, Furey (2008) discovered that schools which participate in virtual learning lose control of some educational structures. School yearly schedules, daily timetables, the scheduling of science laboratories and special school events, administrative instructional planning, fiscal planning, resource allocation and teacher assignment, all of which were governed locally by school principals and councils must now fit within the structure of provincial virtual schooling. For example, the daily timetable of classes must be mandated by the virtual school in order to synchronize delivery across the system. However, in fixing the schedule for virtual course offerings, the virtual school also dictates local schools’ schedules including opening times, length of class periods, recess times, lunch times and closing times (Furey, 2008). Standardization is the price paid for being a member of a sharing community of learners.

At present schools in rural Canada are increasingly developing open and flexible academic and administrative structures as they electronically link with one another (Haughey & Muirhead, 2004; Stevens & Stewart, 2005). As organizations have adapted and administrative structures have changed to enable teachers to effectively deliver virtual classes in traditional schools, new positions within the education system and new roles for traditional positions have had to be created (Zucker, Kozma, Yarnall &

Marder, 2003).

New Roles for the Integration of Face-to-Face and Virtual Learning

The responsibility for effective student learning, and the necessary professional development to ensure effective teaching, is shared by many roles in a combined virtual -face-to-face school system. Some roles in the face-to-face school have counterparts in the virtual school (e.g., teachers and e-teachers) while other roles are unique to the virtual organization (e.g., instructional designers). Teachers and principals in face-to-face schools who are asked to support students who enroll in distance education courses have found that their local role changes to some extent (Furey, 2008).

Onsite principals

Principals and teachers appointed to the closed, autonomous learning environments of face-to-face schools frequently discover that their new role requires the development of open structures within which they are increasingly expected to collaborate with their peers located on a range of distant sites (Furey, 2008). Many now find that the positions to which they were appointed in face-to-face (i.e., traditional or closed) schools have become, in effect, locations within new virtual (i.e., open) electronic schools. In Canada open electronic school sites (most of which are located in rural areas) and the integration of actual and virtual classes (Stevens and Stewart, 2005) is now a challenge for educational administrators seeking to maximize the potential of on-site and on-line teaching and learning.

Mentors and m-teams

The primary responsibility and ownership of students engaged in virtual learning belongs to the actual schools through which these students still acquire the majority of their required courses. In addition to these students being supported by the actual school in the traditional sense, schools have formed mentor teams or *m-teams* to take on additional roles related to virtual learning (Furey, 2008). The primary member of the m-team is the mentor teacher who provides curriculum, resource and social supports for virtual students as well as monitoring student progress. The teacher responsible for the school network is also a member of the m-team and acts as a technician to troubleshoot minor problems. The school principal is responsible for student registration and to ensure that a student avails of the appropriate curriculum programming to meet graduation requirements. In the province of Newfoundland and Labrador, CDLI provides the professional development for each of these m-team members to fulfill their roles through initial training days and ongoing support. However, it is important to realize that schools which avail of distance education have small numbers of students and staff, and that in some instances all of these m-team roles may be assumed by only two or even one individual.

Onsite or Face-to-Face Teachers

A challenge facing many face-to-face teachers is finding effective ways of integrating information and communication

technologies (ICT), including the internet, into teaching and learning. It is not difficult to add information and communication technologies to any classroom but it requires considerable planning to integrate ICT into curricula so that both teaching and learning are enhanced. Teachers who participate as members of m-teams have indicated that assuming local responsibility for courses they do not teach has been an extra and unexpected duty. These face-to-face teachers assume the following responsibilities for distance education students in their schools: scheduling and supervision of science labs, tests and examinations; helping these students with time management; keeping them on task and providing motivation when necessary. However, some face-to-face teachers have expressed amazement at the accomplishments of their online peers and how effective ICT can be in the delivery of programming (Furey, 2008).

Electronic or e-Teachers

E-teachers are experienced face-to-face teachers from the public school system who have elected to teach online. These full time teachers are subject area specialists with proven records of teaching excellence and curriculum development work. CDLI has grouped e-teachers into subject-specific or subject-related “pods” (e.g., mathematics teachers) to encourage collaborative learning and facilitate the virtual school’s administrative structure. Class sizes for e-teachers are generally kept to a maximum of 20 students who may be situated throughout the province, or even nationally or internationally depending on individual student circumstances. Although E-teachers are situated in provincial school district offices or face-to-face schools, most take advantage of every opportunity meet their students in a real-world setting.

Virtual School Administrators

CDLI has a director who has a liaison role between the government Department of Education of Newfoundland and Labrador and CDLI. Beneath the director there are five key administrators. An administrator for program delivery and school services acts as the principal for the virtual school establishing student demand for course offerings and assigning teaching duties. An administrator responsible for program development works as an instructional designer with curriculum developers and consultants to enrich existing high school courses and develop new ones. An administrator responsible for school technology integration works to facilitate technology initiatives with face-to-face teachers and students in grades Kindergarten to nine. An administrator responsible for communication and connectivity services is the chief technician who ensures the stability and growth of the CDLI intranet, investigating new and effective technologies. These management roles reflect, to some extent, the four different distance education subsystems described by Simonson, Smaldino, Albright and Zvacek (2006) – the regulatory subsystem, the course subsystem, the student subsystem, and the logistics subsystem. In addition, CDLI has a fifth administrator responsible for face-to-face and e-teacher professional development facilitates the development and delivery of opportunities and resources.

Web Initiatives Facilitators or Web-ifs

Before school district restructuring and consolidation in September 2004, web initiatives facilitators were a district-based liaison

between CDLI and face-to-face schools. Initially, this administrative role included facilitating district administrative, financial and technical supports for CDLI, ensuring the application of school district policies to distance education, working with school principals on student registrations, and leading m-team training. However as the administrative structures within CDLI developed, many of these functions were assumed by the CDLI administrator for program delivery and school services. However, at least one provincial school district has retained this liaison role with CDLI.

Instructional Designers

Instructional designers are responsible for adapting the form of provincial government curricula, as specified in course curriculum guides, to a web-based environment. They ensure that the digital offering of prescribed high school courses enable distance education students to fulfill all of the prescribed provincial government's learning outcomes. However, in fulfilling this role, it must be recognized that instructional designers have gone beyond simply adapting material and have created many useful new and unique learning resources to support the e-teaching and distance education students. These resources have also been made available to teachers and students engaged in face-to-face learning.

Technical Support

Technical support for the delivery of virtual courses was initially envisioned as a collaborative effort between CDLI technicians, school district technicians, and locally-based school teachers who had technical expertise. However, the job of providing the specific expertise needed for the technologies introduced by CDLI quickly became the domain of technicians while teachers adopted a troubleshooting role between students and technicians. District technicians are trained by CDLI on a regular basis and as new technologies are introduced and much of their work these days is done remotely through the CDLI intranet. The importance of providing technical support to face-to-face schools willing to offer their students distance education courses cannot be understated. CDLI has established the uninterrupted delivery of scheduled classes as one of their top priorities.

Conclusion

With the emergence of electronic educational structures linking schools and providing increased access to information and web-based courses, new challenges face both educators and learners (Furey & Murphy, 2005; Hobbs & Christianson, 1997; Picciano, 2006). Based on advances in technology and government policy, educators in Newfoundland and Labrador have developed new educational structures such as intranets, new role descriptions for face-to-face educators and new management positions in high school distance education. The first challenge facing local educators is to institutionalize these changes (Furey, 2007). In Newfoundland and Labrador virtual schooling for rural communities is a political priority.

The Centre for Distance Learning and Innovation, as with many other educational institutions (Russell, 1999) has reported no significant differences in student achievement between virtual and face-to-face classrooms (Galway, 2004). It is possible researchers have been asking the wrong questions. Teachers establish expectations in virtual classrooms for independent work

and individual initiative (Stevens, 1999; 2000) that appear to lead some students to the development of new skills, self-reliance and autonomy. The larger research question may be: “Is there any significant difference between virtual and face-to-face classes in the development of student learning skills?” And the answer may be: “Better teacher-student relationships and higher expectations, not technologies, may be the primary differences between the virtual and face-to-face environments.” More research is needed to explore this possibility.

A final challenge is to redesign the educational system to incorporate distance education as a standard approach to teaching and learning for the benefit of all students – urban as well as rural. Over three decades ago Cross (1976) pointed out that we must move beyond “education for all” to “education for each” and program equity has been a driving force behind the development and adoption of distance education in Canada (Furey & Murphy, 2005). Distance education in the form of virtual schooling has become a fundamental building block for educational systems which may be used to not only meet the needs of rural students, but to enrich the learning of all learners.

References

Boone, W. (1997). *A partnership model for distance education in Newfoundland and Labrador*. St. John’s: Government of Newfoundland-Labrador, Department of Education.

Brown, J., Sheppard, B., & Stevens, K. (2001). *Final Report: Effective schooling in a telelearning environment*. St. John’s: The Centre for TeleLearning and Rural Education.

Blomeyer, R. and Dawson, M. (2005) Virtual Schools: Policy and Practice Considerations, in Z. Berge and T. Clarke (Eds.), *Virtual Schools: Planning for Success*, New York and London, Teachers College Press, pp. 61-76.

Collis B (1996) *Telelearning in a Digital World - The Future of Distance Learning*, London and Boston, Thompson Computer Press.

Cross K.P. (1976) *Accent on Learning: Improving Instruction and Re-Shaping the Curriculum*, San Francisco, Josey-Bass.

Creighton, T. (2003) *The Principal as Technology Leader*, Thousand Oaks, CA, Corwin Press.

Dabbagh, N. and Bannan-Ritland, B. (2005) *Online Learning: Concepts, Strategies, and Applications*, Upper Saddle River, NJ, Pearson.

Department of Education, Government of Newfoundland and Labrador (2006) *Education Statistics – Elementary - Secondary*

2005-2006 School Information http://www.ed.gov.nl.ca/edu/pub/stats05_06/SCH_05_2.PDF.

Furey, D. (2007). Leadership in distance education: Transformation, re-organization and change in a Newfoundland setting. In, K. Anderson (Ed.), *Leadership studies: A compendium of research by new and emerging Canadian scholars in leadership research*.

Furey, D. (2008). From radio broadcasts to virtual reality: A case study of distance education in Hermitage Bay Schools. Paper presented May 2, 2008 at Symposium 2008, *From the Rhetoric to the Reality, Fifty Years of Educational Change in Newfoundland and Labrador*. St. John's: Memorial University of Newfoundland.

Furey, D. & Murphy, E. (2005). An introduction to K-12 virtual schools and schooling: Factors enabling growth and impacts on traditional systems, schools and roles. *The Morning Watch: Educational and Social Analysis*, 32, 3-4.

Galway, G. (2004). E-Learning as a means of promoting educational equity in rural and remote communities: A Canadian case study. Paper presented at the 2003 OECD Workshop: Promoting equity through ICT in education, Budapest (pp. 70-77).

Haughey, M. and Muirhead, W. (2004) Managing Virtual Schools: The Canadian Experience, in C. Cavanaugh (Ed.) *Development and Management of Virtual Schools: Issues and Trends*, Hershey, PA, Information Science Publishing, pp. 50-67.

Hobbs V. M and Christianson J.S (1997) *Virtual Classrooms*, Basel, Switzerland & Lancaster, Pennsylvania, Technomic Publishing.

Information Highway Advisory Council (1997) *Preparing Canada for a Digital World*, Ottawa, Industry Canada.

Moore, M. and Kearsley, G. (2005) *Distance Education: A Systems View*, 2nd Ed., Toronto, Thompson Wadsworth.

Picciano, A.G. (2006) *Educational Leadership and Planning for Technology*, 4th ed., Upper Saddle River, NJ, Pearson.

Riggs, F. (1987). *Report of the small schools study project*. St. John's: Government of Newfoundland-Labrador, Department of Education.

Russell, T. L. (1999) *The No Significant Difference Phenomenon as Reported in 355 Research Reports, Summaries and Papers. A Comparative Research Annotated Bibliography on Technology for Distance Education*, Raleigh, NC, Office of Instructional Telecommunications, North Carolina State University. Available at: http://ifets.ieee.org/periodical/vol_3_99/book_review_russell.html.

Simonson, M., Smaldino, S., Albright, M. and Zvacek, S. (2006) *Teaching and Learning at a Distance: Foundations of Distance*

Education, Upper Saddle River, NJ, Pearson.

Sparkes, R. & Williams, L. (2000). *Report of the Ministerial Panel on Educational Delivery in the Classroom*. St. John's: Government of Newfoundland and Labrador, Department of Education. Retrieved August 21, 2006, from <http://www.edu.gov.nf.ca/panel/cover.html>.

Stevens, K.J. & Stewart, D. (2005) *Cybercells – Learning in Actual and Virtual Groups* Melbourne, Thomson-Dunmore.

Stevens, K J. (2000) Telelearning and the Education of Rural Students in Newfoundland and New Zealand *Géocarrefour - Revue de Géographie de Lyon (Espaces Ruraux et Technologies de L'Information)* Vol. 75, No.1, pp: 87 – 92.

Stevens, K J (1999) A New Model for Teaching in Rural Communities – The Electronic Organisation of Classes As Intranets, *Prism – Journal of The Newfoundland and Labrador Teachers' Association*, Winter, Vol. 6, No 1, pp: 23 – 26.

Verduin J. R. and Clark T.A (1991) *Distance Education The Foundations of Effective Practice*, San Francisco, Josey-Bass

Weir, H. (1995). Strong acceptance and rapid growth. *Prospects*, 2(3). Retrieved September 30, 2007, from <http://www.stemnet.nf.ca/Community/Prospects/v2n3/index.htm>.

Weller, M. (2006) The Distance from Isolation: Why Communities are the Logical Conclusion of E-Learning, in A. De Figueiredo and A. Afonso (Eds.), *Managing Learning in Virtual Settings: The Role of Context*, London, Information Science Publishing.

Zucker, A. Kozma, R., Yarnall, L. and Marder, C. (2003) *The Virtual High School: Teaching Generation V*, New York and London, Teachers College Press.