

Organizational, Pedagogical and Conceptual Changes in the Provision of Education in Rural New Zealand and Atlantic Canadian Communities

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Abstract

In New Zealand and the Canadian province of Newfoundland and Labrador schools in rural communities have adapted to the e-environment to create enhanced learning opportunities for young people. Traditional rural schools have become constituent sites in educational intranets within which e-learning has developed. Intranets provide electronic frameworks within which virtual classes can be organized between rural sites and through which teachers and learners can interact in new ways. Within these electronic educational structures pedagogical considerations have emerged, including the integration of virtual environments to complement and extend traditional schools. It is possible that the adaptation of rural schools to the e-environment will provide lessons for other schools.

Keywords: e-learning, e-teaching, intranet, collaborative teaching, sparsely-populated regions, New Zealand, Newfoundland and Labrador

1.0 Introduction

Schools have always been important institutions in rural communities, but in many parts of the world they face the problem of declining student enrolments and, consequently, difficulty in providing the range of curriculum options for students that are available in larger city schools. Parents sometimes wish to move from rural communities to be able to enroll their sons and daughters in larger urban institutions to take advantage of enhanced curriculum opportunities. In developed societies with access to emerging learning technologies and the Internet, an increasing number of small schools in rural communities have developed new structures and, within them, new processes for teaching and learning. In doing so, they have contributed to the development of e-learning and the management of digital knowledge and, indirectly, to strengthening rural community infrastructures.

Rural schools in a growing number of developed societies have been transformed through the adoption of information and communication technologies and the Internet (Cavanaugh, 2001; Dell, 2005). New teaching and learning environments have emerged and traditional ways of providing education in rural communities have changed. Schools that are physically small when considered in terms of the number of students who attend in person, on a daily basis, have in some cases become large educational environments. The transformation of many rural schools over the last decade has been based on the integration of information and communication

technologies with teaching and learning together the administration of classrooms. In many cases, the adoption of e-learning and the development of virtual classes have extended educational opportunities for students in rural communities (Barker, 1994; Dorniden, 2005).

In New Zealand and Atlantic Canada small schools in rural communities have contributed to the development of e-learning by adopting emerging information technologies to enhance teaching, learning and the organization of education. The adaptation process took place in stages, starting in rural New Zealand, and continuing in the Atlantic Canadian province of Newfoundland and Labrador. The introduction of e-learning to sustain and enhance rural schools in New Zealand and Atlantic Canada was influenced by similar developments in other rural parts of the world including Iceland (Stefansdottir, 1993) and, later, Russia (Sandalov, Sukhareva, Barry, Piper, & Stevens, 1999).

2.0 The Background: Rural New Zealand and Atlantic Canada

New Zealand is one of the most geographically-isolated countries in the world with an economy that has been, for much of its history, largely based on primary production.

Rural communities have been integral to New Zealand society and its economy and small schools have played an important role in the lives of many of its people. Recent provision of education in rural New Zealand has been shaped by the interaction of government policy (Education Review Office, 2005; New Zealand Ministry of Education, 2002) with technological and pedagogical changes (Gilbert, 2005).

The Atlantic Canadian province of Newfoundland and Labrador is almost entirely rural. It is one of the most remote parts of Canada, with a population of approximately 550,000 people. Approximately two thirds of its schools are located in small, rural coastal communities. With the decline of cod fishing and fish processing upon which many rural Newfoundlanders have depended for their livelihoods, an increasing number of people have had to leave their small communities, known as “outports,” to seek employment elsewhere. Many rural Newfoundland and Labrador communities have, accordingly, declined in size over the last two decades, yet, it could be argued, some outport schools have become larger educational institutions while the number of students attending them, in person, on a daily basis, has declined. The adoption of e-learning in rural New Zealand education influenced its introduction and direction in rural Newfoundland and Labrador (Stevens, 2001). Although New Zealand and Atlantic Canada are on opposite sides of the world, rural schools and communities in both places have much in common.

2.1 Rural Schools and the Adoption of e-Learning in New Zealand

The provision of extended learning opportunities for people in sparsely-populated communities presents policy issues for the New Zealand government. Like most developed societies, the government of New Zealand has had to consider the education of people who live beyond major centres of population if educational and vocational opportunities are to be provided that are comparable to those available to students and their families in urban areas. It is important for governments committed to the provision of equal opportunities for all citizens that access to quality education is provided regardless of location (Ministry of Education, 2006). To ensure sustainable regional development, the provision of education that is at least as good as that provided in cities is essential to retain people, particularly professionals, in small

communities that are distant from major centres of population. However, it is often difficult, in financial terms, to justify the appointment of full-time, on-site instruction for small numbers of senior students in schools in rural communities. Distance education has traditionally played an important role in the delivery of educational opportunities for people in New Zealand rural communities. Increasingly, however, e-learning has been adopted in rural communities to enhance educational opportunities through the creation of electronic structures and processes that complement traditional schools.

The adoption of telecommunications technologies has provided a way of sustaining rural educational infrastructures in several regions of New Zealand by enabling teachers and students to electronically link with one another to share resources (Stevens, 1999a; Stevens & Moffatt, 2003). The development of e-learning in New Zealand took place at a time when many rural schools were under threat of closure because of their small enrollments and, in financial terms, their relatively high overheads. A feature of telecommunications technologies in rural New Zealand schools has been the realization by teachers and administrators of their potential to connect one site with another, thereby challenging educational considerations of institutional size, location and access to human, curriculum and technological resources (Stevens, 1999b). By linking computers to telephone lines through modems, audio-graphic technology developed in several parts of the country before the internet became available. Audio-graphic teaching, as the name suggests, enabled teachers and learners to hear one another and to share print and graphic material on screens. This elementary form of e-learning served many small communities very effectively. In the Canterbury region of the South Island and the north east coast of the North Island of New Zealand, where there is a predominantly Maori community, small rural schools formed virtual classes to collaboratively teach senior students in a range of specialized high school subjects. Teachers and students in a growing number of rural schools in New Zealand now have tele-presences in multiple sites during the course of a school day through the creation of virtual classes based on the internet. Three stages can be identified in the development of virtual classes in New Zealand (Starkey & Stevens, 2006).

Initial development of rural school networking and the development of virtual classes took place in the remote north east coast region of the North Island of New Zealand where there is a predominantly Maori population, before the Internet was introduced for teaching and learning. It has often been difficult to attract and retain teachers in this rural part of New Zealand and, consequently, some schools did not have enough teachers to provide on-site instruction for students. To counter this problem a small, three-site electronic network was developed to share teaching resources. As well as linking with one another, each site had access to a growing range of extranets (external systems): to larger urban schools, to polytechnics in other parts of the country and to the New Zealand Correspondence School in the capital, Wellington. Senior students in the three small, predominantly Maori communities were provided with access to each of the other two schools in the East Coast network as well as to a small range of non-local educational and vocational resources. The network attracted the attention of educators in the South Island who collaborated in the development of virtual classes for rural communities in the southern part of the country.

The second stage in the development of virtual classes took place in the Canterbury region of the central South Island of New Zealand which contained twelve rural communities, each with its own school. With increased rural-urban migration, many

communities in Canterbury had become smaller and enrollments in most schools were declining and some schools faced closure. Parents had to consider the prospect of disruption in the education of their sons and daughters by sending them away to larger schools or moving, as families, to larger urban centres. The development of the inter-school network that became known as “Cantatech” (The Canterbury Area Schools Technology Project) brought twelve rural schools together, initially by audio-graphic technology and subsequently through the internet, to consider ways in which teaching and learning resources could be shared. Each school was able to provide its students with teaching in the core subjects on-site: English, Mathematics and Science, as well as instruction in one or two specialized subjects (e.g., French, Japanese, Economics, Agriculture). By collaborating in the teaching of specialist subjects between the schools in this part of rural New Zealand, senior students who wished to receive instruction in courses not locally available, on-site, have been able to access them from a participating site within the Cantatech network. By mutual consent, designated schools in the Cantatech network accepted responsibility for a particular area of the curriculum in which they had a qualified teacher. In return, schools that provided specialized expertise on-line in a designated area of the curriculum could expect to receive other subjects for the benefit of their own students for which they had no on-site teacher. Like the initial north east coast network, Cantatech developed extranets to selected polytechnics and other educational organizations to extend learning opportunities for rural Canterbury students. A problem facing teachers in the development of the Cantatech network was a lack of guidance from developments in other places. All participating teachers had been prepared to teach in classrooms but none had had any experience of teaching online. A common problem was that the initial teachers in this network often talked as much online as they did in front of their traditional classrooms. Students experienced difficulties participating in lessons from other sites if questions were not frequently asked and interaction encouraged.

By collaborating in the appointment of specialist teachers on each Cantatech site to avoid duplication of human resources and encourage the development of a wider range of specialist appointments, each school in the network has been able to provide its senior students with access to an extended range of learning opportunities. Teachers appointed to any of the Cantatech schools were expected to be able to provide courses in both traditional face-to-face mode, on site, as well as on-line, as required. The development of the Cantatech network brought about many changes in the administrative and academic life of each school. Each school in the network has had to academically and administratively interface with each of the other schools in the region and thereby work collaboratively in the interests of a much broader community than its originally-designated local one. Because of the necessity of finding new solutions to the delivery of education to geographically isolated senior students, each school in the Cantatech network has had to consider the role of information technology in the curriculum. For teachers, students, administrators and people in each of the participating communities, information technology has become a means to enlarge local educational, and indirectly, vocational, opportunities. E-teaching and e-learning in rural Canterbury have challenged the competitive model of education in New Zealand, based on individual, autonomous schools, and demonstrated the value of a collaborative, integrated virtual organization, particularly for senior students. The Cantatech network has empowered twelve small and geographically isolated schools to deliver an extended range of subjects to senior students.

The third stage in the development of e-learning and the creation of virtual classes took place in the last decade and used the Internet as its foundation. Since 1998 a National

Information and Communications Technology Strategy has been developed and implemented throughout New Zealand (Ministry of Education, 1998). This national strategy included such initiatives as an on-line resource centre to provide teachers with multi-media resources, website development and curriculum support, professional development for the implementation and planning of information technology in teaching and learning and the creation of twenty-three “professional development” schools, strategically selected from throughout the country, whose purpose was to assist the development of information technology in other schools within their local areas. Each of these schools was chosen primarily for the information technology expertise on its staff.

The three stages in the adoption of virtual classes in New Zealand were characterized by their rural origins, an emphasis on collaborative teaching and learning within an otherwise competitive school system, co-existence of traditional print-based distance education institutions with e-learning (based on information and communication technologies) and direct government involvement in the development of e-learning within the existing school system since 1998.

2.2 Rural Schools and the Adoption of e-Learning in Atlantic Canada (Newfoundland and Labrador)

Atlantic Canada consists of four provinces: New Brunswick, Prince Edward Island, Nova Scotia, and Newfoundland and Labrador. Newfoundland and Labrador covers by far the largest area of Atlantic Canada and, particularly in Labrador, there is very sparse population settlement. Newfoundland and Labrador’s small population in a large geographic area (156,185 square miles) presents challenges for the delivery of education, particularly at the senior high school level. Newfoundland and Labrador has many small coastal communities, a predominantly rural lifestyle in most of the province and a distinctive history and culture. In the last decade there has been considerable re-organization of the school system in Newfoundland and Labrador, largely because, as in New Zealand, there has been rural to urban migration together with a net outflow of people from the province. Small schools were not only getting smaller; many of them have been closed permanently. In 1996 ten Anglophone school district boards were created in the province together with one province-wide Francophone board, a reduction from 26 school boards. With continued reduction in school size in most rural Newfoundland and Labrador communities, the provincial administration of schools was further reorganized in 2003 to create one Francophone school and four Anglophone school boards. Thirty one percent of educational institutions in the province of Newfoundland and Labrador are designated “small rural schools” (N=122) and 75 of these have fewer than 100 students. The search for appropriate new educational structures for the delivery of education to students in rural Newfoundland and Labrador led to the development of school district intranets, within which virtual classes, based on e-learning, have been organized. The large proportion of small schools located in rural communities required special consideration in the development of new, electronic educational structures. Earlier developments in New Zealand, outlined above, were influential in the development of e-learning in Newfoundland and Labrador (Stevens, 2003b).

(i) The Adoption of Web-based Science Courses

The development of Advanced Placement (AP) Web-based courses in Biology, Chemistry, Mathematics and Physics took place within a development team in each

subject area.¹ A lead science teacher in each discipline was paired with a recent graduate in each of the disciplines of Biology, Chemistry, Mathematics and Physics who possessed advanced computer skills including web page design, Java and HTML. The lead teacher and the graduate assistant were advised from time to time by Faculty of Education specialists at Memorial University of Newfoundland in each curriculum area and, where possible, scientists from the Faculty of Science. The extent to which each web-based course was developed by a team of four people varied. Most course development took place through interaction between lead teachers and the recent graduates. Although at times professors had different opinions as to the most appropriate approach to the design of the courses, this model enabled the four courses to be developed over a sixteen-week summer recess period in time for the 1998-1999 school year (For technical details of the adoption of web-based courses, see below).²

(ii) Teaching Senior Science to Rural Students in Open Classes

In eight schools within the rural Vista school district of Newfoundland and Labrador, 55 students were enrolled in AP Biology, Chemistry, Mathematics and Physics courses.³ While AP courses are a well-established feature of senior secondary education in the United States and Canada, it was unusual for students to be able to enroll for instruction at this level in small schools in remote communities. The Vista school district initiative challenged the belief that senior students in small schools had to leave home to complete their education at larger schools in urban areas. By participating in open classes in real (synchronous) time, combined with a measure of independent (asynchronous) learning, senior students were able to interact with one

¹ Advanced Placement (AP) courses enable senior students to begin undergraduate degrees with part of their program completed from high school if courses are passed at grade levels specified by the university of their choice.

² Minimum specifications were adopted for computer hardware and network connectivity. All schools involved in the project had DirecPC satellite dishes installed to provide a high speed down-link. In most rural communities in this part of Canada, digital telecommunications infrastructures do not enable schools to have a high speed up-link to the internet. Appropriate software had to be identified and evaluated for both the development of the resources and the delivery of instruction within the Intranet. Front Page 98 was selected as the software package. Additional software was used for the development of images, animated gifs and other dimensions of course development. These included Snagit32, Gif Construction Set, Real Video, and similar packages. Many software packages were evaluated and finally WebCT was selected. This package enabled the instructor to track student progress, it contained online testing and evaluation, private E-mail, a calendar feature, public bulletin board for use by both instructor and student, a link to lessons and chat rooms for communication between teacher and student. For real time instruction, Meeting Point and Microsoft NetMeeting were selected. This combination of software enabled a teacher to present real-time interactive instruction to multiple sites. An orientation session was provided for students in June 1998, prior to the implementation of this project in September. Students had to learn how to communicate with each other and with their instructor using these new technologies before classes could begin.

³ The Vista school district contained 18 schools ranging in student enrolment from 40 to 650. The region in which the School District was located extends from Bonavista in the north, (the place where John Cabot landed in North America in 1497) to the Burin Peninsula in the South. It is a large geographic area covering about 7000 square kilometres. The region had a population of about 35,000 people and an economy supported by a diverse infrastructure including fishing, forestry, farming, mining, aquaculture and tourism. The School District was formed in 1996 and became a legal entity in January 1997. There were 5165 students enrolled in the 18 schools in the district who were taught by 366 teachers. The Vista School district has been merged into an enlarged education board, outlined above).

another through audio, video and electronic whiteboards. From time to time the board organized social occasions where students could meet their science teachers in person, as well as one another.

The linking of eight sites through the internet within the Vista School district to collaborate in the teaching of AP Biology, Chemistry, Mathematics and Physics created a series of open classes in rural Newfoundland. The creation of the Vista School District Intranet was an attempt to use information and communication technologies to provide geographically-isolated students with extended educational and, indirectly, vocational opportunities (Healey & Stevens, 2002). This was part of a broader pan-Canadian initiative to prepare people in Canada for the “Information Age” (Information Highway Advisory Council, 1997). The development of the intranet within a single school district involved the introduction of an open teaching and learning structure to a closed one. Accordingly, adjustments had to be made in each participating site so that administratively and academically, AP classes could be taught.

Research into the organization of senior students who were independent learners in a networked environment in New Zealand (Stevens, 1994; 1995) preceded the formation of the Vista Intranet in Canada. Independent learners in New Zealand were found to learn effectively and were able to obtain satisfactory results in national examinations within an electronic network of small rural schools. In the New Zealand situation though, students usually had at least one teacher on site to assist with questions of an academic nature. In the Canadian intranet, this was not always possible. A question facing teachers and researchers in the initial stage of the Vista Intranet was whether students who were not used to being unsupervised could cope with new freedom and accept increased responsibility for their learning. Students were unanimous at the conclusion of the Canadian school year, that to be successful in an AP on-line course, it was necessary to be able to learn independently, cope with a high volume of work and be willing to ask teachers and other learners questions as they arose (Stevens, 2003a).

It was recognized early in the 1998-1999 school year that a common schedule had to be adopted throughout the school district to allow students to interact with their instructors in the intranet (Stevens, 1998; 1999a). Unfortunately, this was not fully realized until after classes commenced, with the result some instructors had to repeat classes for small numbers of students. The initial plan was to allow for five on-line sessions and five off-line sessions. This schedule was not followed in all schools. On-line sessions were scheduled in the morning when network traffic was at its lowest point. Off-line sessions were scheduled in the afternoon.

(iii) From Closed to Open Teaching and Learning

The province of Newfoundland and Labrador has a high rate of use of satellite dishes per capita and there were many schools in the province with Local Area Networks (LANs). As a province, Newfoundland and Labrador provided excellent opportunities for the development of these technologies. Students in the Vista Intranet were frequently subject to scrutiny by their peers as they responded through chat-rooms, audio, video and with their AP on-line teacher. The Intranet provided students with access to multiple sites simultaneously, as well as the opportunity to work independently of a teacher for part of the day. The need to prepare for classes before going on-line became increasingly apparent to both teachers and students if the open, synchronous, science classes were to succeed. The advent of the intranet had

implications for students who were to interact with teachers and their peers in a variety of new ways. The teaching of each of the four AP Science disciplines in the Vista Intranet took place within classes that were open between participating sites. Many students experienced difficulty expressing themselves and, in particular, asking questions in open electronic classes when they did not know their peers from other small communities. The organization of social occasions for students learning science in open classes through the intranet helped overcome these problems by reducing inhibitions such as asking questions on-line.

The major change for the students in the first intranet in Newfoundland and Labrador has been the opportunity provided to study advanced science subjects, as members of open classes, from their small, remote communities. An intranet has many implications for the management of education, based on the need to ensure all sites collaborate both academically and administratively. The most important administrative issue in the first year of the Vista Intranet was the co-ordination of timetables across participating sites. The need for increased technical support for this new, open structure became increasingly urgent for teachers and students who were using information and communication technologies to teach and learn across dispersed sites. Teachers and students had to be provided with expert advice and instruction in the use of new applications if they were to be used with confidence. A common problem in the introduction of e-learning in Newfoundland and Labrador was the fragility of the telecommunications infrastructure. Students in some parts of the network experienced very slow connections and at times they could not connect to the network at all. The local school board found it necessary to direct increased resources to the maintenance of the network, including the introduction of DirecPC satellite dishes to schools, following complaints from AP students and their parents. Many students and their teachers were frustrated by slow internet connections and, in spite of the lack of bandwidth, some students asked for increased use of video conferencing “so we can see the teacher.”

In spite of problems in the introduction of the initial Atlantic Canadian school network, there were also positive outcomes. One AP student reported that he had been introduced to the best teacher he had ever had by being taught by from a non-local part of the network. Another student noted that in spite of technological difficulties early in the course “these courses are valuable.” On reflection, at the end of the school year, a student commented “if you are planning on doing post-secondary education, do one of these courses.”

Following a ministerial inquiry into the development of initial intranets in this part of Atlantic Canada (Government of Newfoundland and Labrador, 2000) the Centre for Distance Learning and Innovation (CDLI) was established within the Department of Education of Newfoundland and Labrador to develop on line courses and coordinate and manage e-learning in schools across the province.

3.0 Rural Schools and the Development of e-Learning

Rural schools in New Zealand and Canada have been using e-learning in the networked environments of intranets to enhance educational opportunities for students who live beyond major centres of population. Three inter-connected developments—organizational, pedagogical and conceptual—guided the introduction e-learning in rural communities in both countries.

Organizational Change

The introduction of teaching from one school to another had immediate implications for the organization of rural education in both Canada and New Zealand. Regional intranets were created within which traditional small schools became, in effect, teaching and learning sites within networks. The Cantatech network in New Zealand and the Vista network in Atlantic Canada were both designed to strengthen education in rural communities. With advances in the Internet and learning technologies, rural schools can now link with educational institutions regionally, nationally and even internationally.

The organization of rural education faces a number of challenges including the management of teaching across multiple sites by teachers who have been appointed not to networks, but to schools. To which principal are networked school teachers accountable? On what grounds should traditional school resources, particularly teachers, be shared across sites? The introduction of virtual classes in traditional rural schools has had administrative implications (Ertl & Plante, 2004). Rural school principals have adapted to this change by collaborating with one another and coordinating classes to facilitate teaching and learning between sites. Collaboration between sites reduces duplication of resources (particularly specialized teachers), while extending learning opportunities.

E-teaching and e-learning within intranets in rural New Zealand and in Newfoundland and Labrador made it necessary for teachers, learners and administrators to adapt to these new, electronic educational structures. Teachers, students and administrators in New Zealand and Newfoundland and Labrador found themselves working in a different educational structure from the traditional and, by comparison, closed educational environment of the autonomous school. Principals and teachers appointed to the closed, autonomous learning environments of traditional schools frequently discovered that the administration of knowledge in intranets led to collaborative pedagogy with peers located across distant sites (Richardson, 2001; Stevens & Stewart, 2005).

Pedagogical Change

Pedagogy includes “the complexity of relational, personal, moral, emotional, aspects of teachers’ everyday acting with children or young people they teach.” (Van Manen, 2002). Teaching in classrooms that are electronically linked to other sites requires different lesson preparation and delivery skills from teaching face to face. For teacher–student interaction in networked electronic structures to be effective, the strengths and weaknesses of the new environment had to be understood by all participants. Audio-graphic networking that preceded the creation of internet-based intranets provided rural New Zealand and Canadian schools with a simple and flexible way of accommodating the diverse needs of learners. Open internet-based classrooms were able to provide rural New Zealand and, subsequently, Newfoundland and Labrador schools, with access to extended curricula and, thereby, enhanced learning opportunities.

Students often have more independence in managing their learning in open electronic classes but most have to be assisted by teachers in the setting of goals, the meeting of deadlines and in evaluating their progress. Teachers are effective in open electronic classes if they can be flexible in the ways they enable students to participate in on-line lessons. Strategies and protocols for on-line teaching have to be developed between participating schools if all students are to fully participate. The introduction of a rural

school to an open electronic network improves considerably its resource base for both teachers and learners. It is often difficult to coordinate the timetables of networked schools and a considerable measure of inter-institutional and intra-institutional cooperation is required to develop detailed and effective plans for collaboration.

There are several immediate pedagogical challenges to be considered for effective teaching in an intranet. Teaching face-to-face and teaching on-line are different skills. Teachers in rural New Zealand and rural Newfoundland and Labrador have had to learn how to teach from one site to another—a skill that is not normally provided in pre-service teacher education programs. Teaching successfully from one site to another is fundamental to the success of e-learning in rural intranets. In the process, an increasing number of rural teachers have had to learn to work collaboratively with colleagues from multiple sites. Teaching in networked environments increases the visibility of one's teaching style to an expanded audience of both colleagues and non-local students. Rural teachers have to decide when it was appropriate to teach on-line and when it is advantageous to teach students in traditional face-to-face ways. These decisions must be able to be defended on the basis of sound pedagogy (Lai, 2005). Following the development of new educational structures (intranets) and processes (e-learning), many rural teachers in New Zealand and Atlantic Canada make pedagogical choices about the role of information technologies in teaching and learning and about the wider benefits of extending educational opportunities in small communities.

Conceptual Change

The primary contribution of rural schools to the development of e-learning has been the initiation of teaching between schools rather than exclusively, in schools. The introduction of inter-school teaching in rural Iceland from 1989 and shortly afterwards in rural New Zealand, opened new possibilities for the provision of education beyond major centres of population in rural Atlantic Canada. The introduction of inter-school teaching was enhanced with the advent of the Internet. Schools in rural New Zealand and Canada changed from being closed, autonomous learning environments, to become sites within teaching and learning networks.

The introduction of inter-school teaching within which schools became sites within teaching and learning networks, challenges traditional concepts of schools and of the delivery of education in sparsely-populated regions. Classes in rural New Zealand and Atlantic Canada have been expanded in terms of space, time and curriculum capacity. The changes that have taken place in rural New Zealand and Atlantic Canada suggest that it is timely to reconsider the significance, in educational terms, of school location and physical size. Perhaps it is now more appropriate to consider school size in educational rather than in physical terms by the range of courses that can be provided on site rather than the number of students who attend, in person, on a daily basis. There are administrative implications in this development for all schools when considering size and location in internet-dominated educational systems (Brown, Sheppard, & Stevens, 2000; Government of Newfoundland and Labrador, 2000).

4.0 Conclusion

The introduction of inter-school electronic networks has added a new dimension to education in rural communities in both Canada and New Zealand and brought new challenges for teachers, learners and administrators who have had to adapt to different ways of organizing classes (Hawkes & Halverson, 2002). Rural schools in Canada and New Zealand have pioneered ways of expanding learning opportunities by providing

students with enhanced choices through co-operative and collaborative teaching in internet-linked schools (Galway, 2004). The expansion of learning opportunities is likely to be of interest to principals, teachers, parents and students in any system of education.

In rural New Zealand and in Newfoundland and Labrador the open internet-based model has challenged the traditional model of schooling by questioning the need for appointing all teachers to schools, rather than, in appropriate cases, some teachers being appointed to networks of schools. It questions the appropriateness of learners engaging solely with their peers within their own, physical classrooms, and, it questions, ultimately, the very notion of a school in the twenty first century.

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