Chapter 5
Two Quadrants for the Development of Virtual Environments to Support Collaboration between Teachers

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ABSTRACT
The purpose of this chapter is to outline how pre-service teacher education can be adapted to the emergence of virtual educational structures and processes that complement traditional classes. The chapter is based on research conducted in rural schools in the Canadian province of Newfoundland and Labrador that links in-service and pre-service teachers to provide insights for the latter into real-life, networked classrooms, particularly those located in communities located beyond major centres of population, to which most students were likely to be appointed. Face-to-face groups of pre-service teachers were able to include virtual practicing teachers in their discussions. The significance of this study will be judged by the extent to which professional discourse between pre-service and in-service teachers reflects the virtual challenge of intranets to the physical isolation of traditional schools.

INTRODUCTION
The rapid growth and educational application of the Internet has led to a challenge to traditional ways of teaching and learning at a distance (Ben-Jacob et al, 2000) that were based on paper and the postal system. E-Learning is Internet-based and does not require the degree of central control that distance educators have traditionally employed within dedicated institutions. The growth of e-learning in schools has led to pedagogical considerations and to the development of new ways of managing knowledge that enable these institutions to assume extended roles in the regions they serve.
The province of Newfoundland and Labrador has a population of approximately 500,000 people, of whom less than 30,000 live in Labrador. In Newfoundland, the island portion of the province, almost all of the population lives in coastal settlements, including the capital, St John’s. Approximately two thirds of schools in the province are located in rural communities. The decline of traditional rural education in Newfoundland and Labrador coincided with a national initiative to prepare people across the country for the Information Age (Information Highway Advisory Council, 1997; Ertl and Plante, 2004) that provided impetus for the classroom application of emerging technologies. In rural Newfoundland and Labrador the introduction of the Internet and internet-based technologies has had a transforming effect on the capacity of small schools to deliver programs (Brown, et.al. 2000, Healey and Stevens, 2002; Stevens, 2001, 2002b; 1999a). In other developed countries with substantial rural populations to be educated there have also been major changes in the configuration of small schools in isolated communities. In New Zealand (Stevens, 2000; 1999b), Finland (Tella, 1995), Iceland (Stevens, 2002a), Russia (Stevens et al, 1999) and the USA (Dorniden, 2005; Glick, 2005; Schrum, 2005) a variety of communication technologies have been engaged to promote educational opportunities for students and more efficient ways of organizing and managing knowledge in collaborative electronic structures that have implications for regional economies.

In the last decade two e-learning developments have changed the nature of education in rural Newfoundland and Labrador: (i) the introduction of the opportunity to study online from schools located in remote communities and (ii) the possibility of enrolment in Advanced Placement (AP) courses from rural schools. Both developments have implications for the professional education of teachers.

BACKGROUND

The Development of Collaborative Structures to Support Rural Canadian Schools

The search for appropriate new educational structures for the delivery of education to students in rural Newfoundland and Labrador has led to the development of school district intranets, within which virtual classes have been organized. In the process of developing e-teaching within school district intranets, several challenges have had to be met. The electronic linking of eight sites within the former Vista school district to collaborate in the teaching of AP Biology, Chemistry, Mathematics and Physics created a series of open classes in rural Newfoundland that became known as the Vista School District Intranet. 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. 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. The Vista school district initiative challenged the notion that senior students in small schools have 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 another through audio, video and electronic whiteboards.

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. While AP
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