THE NURSE ON THE ROOF WITH THE SATELLITE DISH: A CRITICAL STUDY OF TELEHEALTH IN A SMART COMMUNITY

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Bachelor of Arts (Honours), University of Ottawa, 2002

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

In the School
of
Communication

SIMON FRASER UNIVERSITY

June 2004

APPROVAL

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A Critical Study of Telehealth in a Smart Community

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ABSTRACT

Currently telehealth is being offered by federal and provincial policy documents as an innovative solution to austerity, staffing issues and problems accessing care in Canada's rural communities. Despite this current enthusiasm for telehealth, many of these promises have not been realized.

The Labrador region is a large and sparsely populated area that was awarded a federal "Smart Community" project to increase the region's technological capacity, making it one of the most connected locales in the country. Although telehealth was a key component of the SmartLabrador plan, there has been limited uptake of newly available technologies for this purpose. I critically examine the factors surrounding this lack of uptake, and take the work of Harold Innis as a starting point when addressing the research question, *What are the socio-technical barriers to telehealth use in Labrador?*

Using the theoretical frameworks of spatialization, structuration and work practice, I argue that the context in which telehealth is situated figures largely into its success or failure. Analysis of the Labrador telehealth context reveals how attempts to bridge distance are limited by organizational factors, technical problems, staff turnover and a lack of provincial telehealth policy. Examining telehealth in the user context reveals several constraints that have limited the usage of new technologies for health communication in Labrador. The barriers to telehealth use are not simply technical, but relate to issues of privacy, liability, and inter-agency coordination.

I examine the socio-technical barriers to using telehealth, and make the overall argument that the user context must be considered as the centre of program design. Telehealth in Labrador has been impeded by a variety of factors, such as the malfunction and inflexibility of technology, chronic shortage of staff and the fiscally restrained health system. These contribute to the problematic positioning of telehealth as a cure-all for accessing health services in remote environments. Most importantly, there is a need to implement telehealth policy at the provincial level, and to address the lack of user involvement in health services planning, which are the biggest barriers to making telehealth a viable means of health service delivery in Labrador.

DEDICATION

To my dear friend Christine, who has taught me about bravery, laughter, baked goods and exploration; to the Davis family, who welcomed me so wholeheartedly into the paradise of Lanse Amour; and to my family, who love me so very well. Thanks for you.

ACKNOWLEDGEMENTS

This thesis could not have been written without the support of several people. Firstly, I would like to thank my senior supervisor, Dr. Ellen Balka, for providing me with the academic support to write a thesis and the financial support to conduct my fieldwork. I would also like to thank the other members of my committee, Drs. Alison Beale and Gary McCarron for their guidance and support. Thanks are also extended to Dr. Hal Siden for serving as the external examiner on this thesis. In addition to this formal academic support, I would like to thank Sheila Downer and SmartLabrador, my community partner, for welcoming me into the organization and making me feel so excited about my work. I would also like to acknowledge Health Labrador and TETRA for allowing me to conduct my research with their staff. To all of those who enriched this work with their experiences and knowledge, my sincere thanks. I would also like to thank my hosts, Rita and Cecil Davis, and their family for sharing their home, laughter and great food with me. And thanks to Wayne Earle for helping me develop the non-academic but nonetheless important skill of salmon fishing.

My M.A. experience has been greatly enhanced by the inspiring group of people with whom I work at the Assessment of Technology in Context-Design Lab. One could not ask for better colleagues, and their mentorship and solidarity have meant the world to me. I would also like to thank Claire Dimond-Gibson for her elaborate lunches and editorial prowess. Finally, a huge thank you is extended to Neena Shahani, Lucie Menkveld, Evelyn Hassen and Denyse Zenner for their help along the way.

I would also like to acknowledge the financial contributions of the Social Science and Humanities Research Council, the Western Region Training Centre for Health Services Research and the Advanced Systems Institute to this thesis.

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LIST OF ABBREVIATIONS AND ACRONYMS

ARNN	Association of Registered Nurses of Newfoundland and Labrador
CIHI	Canadian Institute for Health Information
CCOHTA	Canadian Coordinating Office of Health Technology Assessment
CANARIE Inc.	Canadian Network for the Advancement of Research, Industry and Education
CAP	Community Access Program
ERC	Economic Recovery Commission
ICT	Information and Communication Technology
IHAC	Information Highway Advisory Council
NIFTE	National Initiative for Telehealth
NLCHI	Newfoundland and Labrador Centre for Health Information
OHIH	Office of Health and the Information Highway
OTA	Office of Technology Assessment
TETRA	Telehealth and Educational Technology Resources Agency

Chapter One:
Technology, Telehealth and SmartLabrador

Introduction: Technology and Telehealth

According to Franklin (1999, p. 1), technology has "built the house in which we all live." Given the omnipresence of technology in the personal and professional lives of most Western citizens, that there are many competing perspectives on technology is not surprising. These perspectives range from the utopian "tech fix" (Weinberg, 2003) to the determinist dystopian writings of Ellul (1964). Wajcman (2003, p.137) defines technology as having three components: technology as a "form of knowledge;" as "human activities and practices;" and, most simply, as physical artifacts. A critical perspective on technology is central to my study, one that is best articulated by Franklin (1999):

> ...it may be wise, when communities are faced with new technological solutions to existing problems, to ask what these techniques may prevent and not only check what these techniques promise to do (p. 51).

I approach telehealth from the same critical perspective on technology. While the field of organizational communication offers some insight into how technology is implemented between organizations, this field typically treats technology in a determinist manner (Orlikowski, 2001). Determinism is a long standing ideology of technological inevitability, one which argues that "the development and use of technology followed a fairly linear path, that technological change was a kind of univocal determining force with a momentum and highly predictable outcomes" (Winner, 2001, p. 12). An important

distinction exists between determinism and the "tech fix." While determinism makes historical arguments about the inevitability of technology, the "tech fix" is built upon the notion that people control technology, and we simply need to harness and direct the power of technology to solve what are often largely human problems. Determinism's omission of the role of human actors and social forces in the development and use of technology is very limiting when attempting to understand technological change in a situated context. I thus decided to situate my work within a political economy of communication and focus on work practice.

This thesis is based upon fieldwork conducted in Labrador during the summer of 2003. Research was conducted in partnership with the SmartLabrador initiative, a federal Smart Community project which grew out of the grassroots Labrador Information Technology (I.T.) Initiative. This partnership helped me to establish contact with telehealth stakeholders in the region; paid for a portion of research travel; and provided me with an office and home base for the duration of the fieldwork.

To begin, a working definition of telehealth is required to situate the research. Sharpe (2001, p. 3) defines the use of ICTs for mediating distance in health care delivery, or telehealth as:

> the utilization of telecommunication technology to link two or more end users by any interactive electronic means, such as telephone, computers, email, fax, and interactive video transmissions for the purpose of transfer and/or exchange of info and data in any health related application.

This includes several incarnations of work, including health care provider-patient consultations, continuing medical education, professional-professional communication, and the transfer of medical data. To differentiate, e-health is generally defined as

Internet-based information activities. The distinction between telehealth and e-health is being blurred as more and more telehealth activities are migrating to an Internet platform (Canada, 2003a).

Since 1994 the federal government has been making increasing financial investments in information technology in the health sector. This movement has been influenced by recommendations made by the Canadian Institute for Health Information (CIHI), the Information Highway Advisory Council (IHAC), the Canadian Network for the Advancement of Research, Industry and Education (now CANARIE Inc.), the Office of Health and the Information Highway (OHIH), and the National Forum on Health.

Given this policy environment, it is not surprising that telehealth is a growing means of health service delivery in Canada, with new programs emerging on federal, provincial and territorial levels. However, in order for new incarnations of telehealth such as videoconferencing to function, a broadband network must be accessible to a health board (one of several bodies responsible for the delivery of health care services in a given region) in order to transmit data. This is in itself problematic, given that many areas in Northern and rural Canada have limited connectivity (Reddick, 2000). These are the very communities which traditionally have limited access to health services due to their remote geography and sparse populations. This, and other barriers to using telehealth, will be explored in this thesis.

Newfoundland and Labrador has a long history of using telehealth to cope with demographic and geographic challenges, with services being provided via Memorial University's medical school for over thirty years. Physician Max House, a "telehealth pioneer" in the province, outlined several principles for the effective use of

telecommunications in health care. They include: 1. basing activities on a genuine need that exists; 2. utilization of the most affordable and simple technology when responding to such a need; 3. creation of a multi-user network; and 4. provision of training and support for users (Elford, 1998). These basic principles offer a practical guide to telehealth implementation. However, no formal evaluation processes exist in Newfoundland and Labrador telehealth applications, making it difficult to ascertain if these guidelines are being followed. While pilot projects and finite programs have demonstrated telehealth's feasibility in the short term, no long term studies have been conducted nor have systematic telehealth evaluation processes been implemented (Canada, 2000). This research serves to fill a small portion of the evaluation gap in Canadian telehealth implementation.

Situating Telehealth

As telehealth grows in the Canadian context, the entire Canadian health sector is in the process of reform. This reform is characterized by an increasing emphasis on health promotion and disease prevention, decentralization of accountability and decision-making, shifts from hospital to community-based services, integration of agencies, programs and services and increased efficiency and effectiveness in service delivery (Canadian Institute for Health Information, 2001). Canadian health care policies and programs are increasingly being developed to promote the use of ICTs in health care, including computer-mediated care and online health information. As such, telehealth in Canada has gained attention in the past several years. Despite the attention it has been receiving, there is little evidence of its efficacy (Health Telematics Unit, 2003). This

raises the question of whether telehealth is an appropriate means of service provision and a good use of health care dollars.

It is important to situate the growth of telehealth in the health context of rural Canadians. The Romanow Report (2002) addresses many of the constraints that rural citizens face, and notes the financial burden that they must carry in order to receive care. While travel costs may be covered by the health care system, costs for family and other networks of social support are not covered, forcing many rural residents to receive care away from the support systems that they normally access. The report cites the centralizations of the early 1990s as a source of this problem, as many local services were consolidated into larger centres (Romanow, 2002). The need for additional services has been clearly demonstrated, and telehealth has been offered as a solution to this problem. However, the ability of telehealth to address this service gap has not been adequately demonstrated (Noorani & Picot, 2001).

Romanow (2002) argues for the increased use of telehealth as a means of mitigating time and distance, bringing patients and health care providers closer together. The Romanow Report states:

> People in rural and remote locations can be linked to family physicians, specialists and other health services in other centres where health care providers can diagnose, treat and provide consultations at a distance... (It is important) to build on the work already underway in many provinces and territories, and to expand the use of telehealth to improve access to health care services and information (p.xxx).

The report notes a lack of coordination between provincial and territorial governments in addressing telehealth implementation in rural communities. It encourages a "coherent national approach" (p. 163) for addressing such issues. Mapping where actors (in this case, health care workers) connect to telehealth services and how they use telehealth

would serve as a means of determining entry points for the creation of such a national plan. It would also offer insights into which efforts succeeded and what barriers to success were encountered.

Beyond government policy documents, a review of academic telehealth literature revealed that the majority of findings reported a positive impact from the creation of a telehealth program. However, there were also several studies indicating that 1. telehealth had advantages over the previous method of health service delivery but also had negative outcomes; 2. it could not be determined if telehealth had advantages, with further study required to reach a conclusion; and 3. other means of health service delivery were more appropriate than telehealth (Hailey, Roine & Ohinmaa, 2001). Hailey et al. critique several reports on telehealth as closer to advocacy than to actual research. While much of the literature argues in support of telehealth, there is a lack of situated analysis of actual existing telehealth programs. Additionally, the existence of what I refer to as the "perpetual pilot project" cycle of telehealth programs makes any meaningful form of evaluation challenging.

While Gagliardi, Smith, Goel and Depetrillo (2003) argue that remote care providers in Ontario would like to have access to videoconferencing, it remains to be seen if the technology would be used as intended if it was made available and actually integrated into the working environment. The definition of rural ("sparsely populated lands lying outside urban areas" (Plessis, Beshiri & Bollman, 2002, p. 8)) includes remote areas (Canada, 2003d), and while a town in rural Southern Ontario is clearly less isolated than a Northern community with no road access, definitions of what constitutes a

remote community are few. However, the separate challenges of implementing a telehealth service in these different environments must be recognized.

Telehealth has existed in a variety of forms in Newfoundland and Labrador for over 60 years, when information was broadcast via the radio as an early means of continuing medical education (personal communication, TETRA staff, 14). Evolving over time, typical telehealth applications in the region use audioconferencing, and less frequently, videoconferencing to connect professionals around the province. SmartLabrador planned to increase the use of videoconferencing for health care meetings, continuing medical education and physician–patient consultations (personal communication, SmartLabrador staff, 4). This could only be done by building a high-speed network over the Labrador region, accomplished by the SmartLabrador project. Videoconferencing requires access to a network with broadband capacity, a shift from the audioconferencing network that uses a telephone line (personal communication, TETRA staff, 14). Before the SmartLabrador initiative, such connectivity was simply unavailable in the area.

Connectivity and the Smart Community Program

Connectivity, which includes access to the Internet and ICTs, is a central part of many new telehealth applications (Noorani & Picot, 2001). Videoconferencing, as an image-based real time medium, requires a broadband Internet connection. As an isolated and sparsely populated region, Labrador typically has not had access to new technologies, and has developed a culture of coping with limited resources (personal communication, nurse, 13). As will be discussed, federal telecommunications policy has played an important role in the history of connectivity in Labrador.

However, connectivity in Newfoundland and Labrador did not begin specifically with large federal funding programs. Instead, it started with a strong grassroots base. In 1988 funding was secured (70% federal, 30% provincial) to establish six telecentres in Newfoundland and Labrador. A telecentre is a community resource for accessing technology in rural areas. One of these telecentres was established in Forteau, Labrador. The Southern Labrador Telecentre prides itself on offering hands-on support to citizens who want to improve their technology skills, and was certainly the first place in which such skills could often be developed. As Downer (n.d., online) states, "with six workstations, two printers, scanning capabilities, electronic mail, and the provision of individual network accounts, the telecentre soon become the region's most prized technological resource." Clearly, the Labrador community has a long history of community-based technology projects. The telecentre is still in use, 12 years after its establishment. While Labrador was working to be ahead of the game, the federal government would put Canada's technological future on the policy agenda by the mid-1990s.

Indeed, the federal government addressed its plan to make Canada the most connected country in the world by the year 2000 in the 1997 Speech from the Throne, (Canada, 1998; Walters, 2001). Soon after, things began to percolate in the area of *Smart Communities*. A year later, the *Smart Communities* initiative was added to the existing *Connecting Canadians* program, originally created by Industry Canada as a means of facilitating public access to the Internet (Walters, 2001). This programming was announced just two years after the Information Highway Advisory Council (IHAC) released its report *Preparing Canada for a Digital World: Final Report of the*

Information Highway Advisory Council, which outlined Canada's future in relation to the Internet. Evidently, Canada was not taking its time in committing to digital infrastructure.

The responsibility for implementing Canada's Internet strategy would lie exclusively in the domain of the federal government's most corporate-leaning ministry. Falling under the umbrella of Industry Canada, *Connecting Canadians* includes several programs, including the Community Access Program (CAP) (designed to provide public access to the Internet at access points in sites such as public libraries), SchoolNet (developed to ensure each school in Canada has at least one Internet connection, though ironically gave no stipulation as to where this connection should be), Computers for Schools (established to provide refurbished computers to schools free of charge), VolNet (created to provide hardware and an Internet connection to volunteer organizations) and Smart Communities (Connecting Canadians, 2003). In 2000, 12 Smart Communities were launched across the country, with the goal of helping to "establish world-class Smart Communities across the country so that Canadians can fully realize the benefits that information and communication technologies have to offer" (Canada, 2003b, online). The Labrador I.T. Initiative, a small technology and community development organization incorporated in 1998 (Canada, 2004), was awarded the provincial Smart Community, resulting in the creation of SmartLabrador. In reality, the SmartLabrador project includes thirty-two communities and was granted over $11 million ($5 million from Industry Canada, the remainder from commitments made by other governmental sectors, notably justice, health and education) to make the Labrador area among the most technologically proficient communities in the world. Its head office is based at the Southern Labrador Telecentre.

The SmartLabrador project is designed to provide Labrador with the infrastructure necessary to become an integrated part of the global information economy, and to enable communication between Labradorians (Downer, 1999). In order to make the SmartLabrador vision sustainable, community needs were addressed through two implementation models. The first, the adoption model, develops services in partnership with existing organizations, which will eventually be taken over by the host organization. The host organization will then pay to use the SmartLabrador broadband network. This covers five areas, including telehealth, a virtual courtroom, government information, distance education, and the Information, Communication and Education (ICE) technologies program. The second group of services are provided under the enterprise model, where services are developed within SmartLabrador, with a plan to make them eventually self-sustaining. This group includes the Heritage Mall, the Labrador News Network, the Labrador Intranet and a Virtual Museum (Downer, 1999).

The SmartLabrador project illustrates efforts by rural and remote citizens to harness the potential of the Internet, and the large amount of federal money ($5 million per project) being targeted for such endeavours (Canada, 2003b). A main motivation of these efforts is "to develop economic, social, and cultural options permitting their citizens to continue to live and work in their home communities" (Rideout, 2000, p. 9). Buy-in from the geographically located community is vital for the success of a Smart Community, as "analysis of community network models reveals that community-based initiatives would probably not have taken place without established locally based partnerships built around the sharing of resources and common goals" (Rideout, p. 15). Health services were an area identified as critically important by the Labrador

community. Telehealth was made a central piece of the demonstration project, with the hope of increasing access to and quality of services, while reducing costs for patients and health boards (personal communication, SmartLabrador staff, 4).

Telehealth was considered to be an especially important service due to the isolated nature of many Labrador communities and the need for better access to health services for the citizens of Labrador. When writing the grant proposal for the project, the executive director of the Labrador I. T. Initiative championed the network of stakeholders that would be necessary to make the project a success. The financial investment of the two health boards that service the region was important, as they are large employers and have large institutional backing (personal communication, SmartLabrador staff, 3). Clearly, the success or failure of telehealth will have a large impact on the overall sustainability of the SmartLabrador network, especially when one takes the small population and large geographic space into consideration.

Like any Smart Community, SmartLabrador had a three year timeline to complete their demonstration project. However, unlike projects based in urban areas, SmartLabrador had to start from an extremely low level of connectivity. Most Labrador communities had dial-up Internet access, which operated from a hub in a larger centre. That meant, for example, that someone using the Internet from an isolated community such as Makkovik would have to pay long distance charges for the time that she or he spent online. Indeed, the infrastructure made available by the SmartLabrador project had a large impact on access to ICTs throughout the region. The ambitious project includes 44 sites in 29 communities (SmartLabrador, online). However, as becomes clear

throughout the following chapters, satellites and fibre cables are not the only elements of connectivity.

Research Questions

Despite the need for better access to health services and access to funding, along with the enthusiasm for telehealth expressed by the SmartLabrador team, telehealth is not emerging as a frequently used means of providing health care in Labrador (personal communication, nurse, 6). As telehealth was expected to be a highly utilized service, this case study attempts to identify the socio-technical barriers to using telehealth in the Labrador context. Research focuses on SmartLabrador and Health Labrador, the integrated health board that serves most of the region. The thesis thus explores the social and technical barriers to telehealth implementation. Key research questions include: *What barriers exist to telehealth implementation in Labrador? What are the experiences of local medical and lay people when using telehealth? Why is telehealth not being used as planned in the SmartLabrador context? What are the links between the micro, meso and macro levels of health care and telecommunications that encourage or prohibit telehealth utilization?*

Outline of Thesis

While telehealth has many different incarnations, my study focuses on the use of videoconferencing as a means of enabling distance care. Videoconferencing for telehealth purposes is growing at a rapid rate in Canada (Noorani & Picot, 2001). There is a gap in the literature dealing with the challenges and problems in implementing telehealth

programs. Examining technology in context offers insight into the situated problems limiting telehealth uptake.

The thesis contains five chapters. This chapter serves as a brief introduction to telehealth. It describes the SmartLabrador project and the federal Smart Community program, and also provides an outline of the research questions. Chapter Two elaborates on the contemporary socio-political context in Labrador, and provides an historical view of the region. Having provided the reader with a snapshot of the Labrador context, I will then situate Labrador in an Innisian analysis of time and space. While Innis provides the basis of the political economic analysis I will be undertaking, Mosco's (1996) contemporary political economy of communication will supplement Innis in this chapter. I will also draw upon the work of Giddens (1984) to expand the discussion of structuration. In order to better link the macro, meso and micro levels of analysis, I will link structuration to work practice. This linkage will better position theory in relation to practice, which is addressed through analysis in Chapter Four.

Chapter Three reviews the technology assessment literature, and I draw extensively on feminist technology assessment as an epistemological guide to data collection and analysis. Technology assessment works in concert with grounded theory, with the themes discussed in Chapter Four emerging from this approach. I then explore the methods (interviews, documentary analysis, and policy mapping) used to triangulate the data.

An analysis of findings follows the methods chapter. In this section, I describe the barriers to telehealth use in Labrador through several themes: technology and spatialization, a brief discussion about commodification, and structuration. As a key

theme, I elaborate on three subthemes within structuration: 1. work practice and design; 2. privacy, confidentiality and liability; and 3. public policy. I examine the validity of an Innisian framework in this context, and expand on the role of rules and resources (Giddens, 1984) in using telehealth.

The fifth chapter concludes the thesis. I discuss the continued importance of place and the role of structure in telehealth in Labrador. I return to my research questions and reflect on the key findings of the case study, which I relate back to theories of time and space discussed in Chapter Two. Finally, I consider future research directions and summarize the key points of the thesis.

Chapter Two:
the Political Economy of Technology in Labrador

I will now discuss the bias of time and space in relation to Labrador's historical position. To begin, I will discuss the Labrador telehealth case in light of the concepts of time and space, first illuminated by Harold Innis. Following this I will contextualize the SmartLabrador project in its historical political economic context. Once the situated context has been explored, I will then elaborate on the *Connecting Canadians* program which funded SmartLabrador, and will include a discussion on the role of myth in Canadian telecommunications policy - notably the Information Highway Advisory Council's (IHAC) role in perpetuating the myths of technical nationalism and technological dependence. Understanding IHAC also helps in setting the context, as the Smart Communities program that enabled the creation of SmartLabrador emerged from the recommendations made by this policy body. I will explore how the compression of space through time is impacting rural communities, and critically evaluate the value-laden perspective of the Industry Canada sponsored initiative. I will then relate these issues to the situated use of telehealth in the Labrador environment.

Having set the stage with an Innisian perspective, I will turn the discussion to Mosco's (1996) political economy of communication, which will situate the research in a contemporary context. Central to Mosco's thesis are three streams of the political economy of communication: spatialization, structuration and commodification. However, as the data will show, the two themes of spatialization and structuration are most

pertinent to the Labrador telehealth case, and are thus discussed in more depth than commodification. In order to ensure the linking of the micro, meso and macro levels of analysis, the macro perspective of structuration will be linked to the meso and micro levels of analysis in telehealth work practice. I conclude with a brief summary of my theoretical grounding, and explain how this is related to the methods chosen in the research design.

Innis on Time and Space

By situating telehealth in communication thought, the current push towards increasingly technologically mediated health care delivery can be examined through Innis' (1994a) theorization of time binding and space binding technologies. Innis (1994a) argues that the bias of communication shifts between time and space binding technologies, which in turn influence the nature of a given society at a certain point in time. This includes not only technology in the traditional sense, but the channels through which communication flows. As Comor (2001, p. 280) argues, "Innis recognizes organizations, institutions and technologies as 'communication media' in that they constitute core structures through which people interact and history itself unfolds." From this perspective, the actual organizations (in this case SmartLabrador and Health Labrador) influence how individuals construct meaning when using telehealth. They decide what constitutes telehealth (e.g. the need for better access to health services and challenges in using the new high speed network). In this sense, Innis conceptualizes structure as a key enabler and constraint, which makes it essential to use a political economy of communication analysis that focuses on structuration in concert with an Innisian framework.

According to Innis (1994c), time binding technologies (technologies that bind people to a situated place at a specific time) tend to be durable and difficult to reproduce and transport. An example of this is a rural practitioner's office, as patients have to visit the doctor's office in real time, with limited electronic or mechanical mediation. In contrast, space binding technologies (those which transcend space and time) overcome geographic barriers that have been traditionally problematic, especially in the Canadian context. For example, videoconference consultation services remove the traditional barriers of accessing a physician in real space, and can enable remote provision of this health service. The technology recently installed throughout the Labrador region was intended to enhance access to health services by mediating distance between patients and care providers and enhancing continuing medical education and professional communication, areas which traditionally have been challenged by the limitations of geographic space.

However, these space binding technologies act at the expense of those that are time binding, which are typically based around traditional forms of knowledge and oral tradition. In this sense, the increased use of videoconferencing services reduces the traditional human interaction between patient and practitioner in health care, and the embodied act of care. However, given the low uptake of videoconferencing for telehealth services, it seems that the time binding technologies of real space remain dominant in the Labrador health care environment.

Building Sustainable Communities:
Situating Telehealth in the Broader Political Economy of Labrador

In the broader context, Newfoundland and Labrador occupies a unique place on the Canadian landscape with respect to space and time. The province's resource based fishing economy has developed a strong sense of interconnectedness and community mindedness (Sinclair, 2002), which led the region to be dominated by time binding means of communication such as speech and narrative (Innis, 1940). However, changes in fishing techniques during the 1970s (involving the introduction of larger vessels and the factory freezer trawler) shifted many fishery workers from the temporally biased inshore fishery to the spatially biased offshore fishery. This type of fishing yielded much higher catches than were ever possible through inshore fishing. These techniques, based on using huge nets to drag the ocean floor, are environmentally unsustainable (Mason, 2002). New methods of fishing, combined with large domestic fishing quotas, foreign overfishing in international waters around Newfoundland and Labrador, and several other factors, resulted in the establishment of a cod moratorium in 1992 that closed the province's main industry and changed the face of life in Newfoundland and Labrador (Mason). Fallout from this event continues, as fewer people are employed in this industry, which was for centuries the economic mainstay.

The past decade has been one of marked change in Labrador, as the number of people employed in the fishing industry has been drastically reduced due to the 1992 cod moratorium. Eleven years following the closure of the Northern cod fishery, there are few signs of the stock's recovery (Mason, 2002; Sinclair, 2002), demonstrating the need for economic diversification in the region. The technologization of Labrador has been hailed as one means of accomplishing this goal. However, this is not a new argument. The

Economic Recovery Commission (ERC), an economic development agency existing in Newfoundland and Labrador between 1989 and 1996 heralded the use of ICTs to make rural communities more sustainable. As J.D. House (1999, p. 24), former chairperson of the ERC states,

> modern information technologies and telecommunications could potentially compensate for some of the traditional weaknesses of the rural economy, especially its dispersed settlement pattern and distance from major metropolitan markets with attendant high transportation costs...computers, modems, faxes, and sophisticated telephones enable people anywhere, including rural Newfoundland and Labrador, to have access to the latest information about business opportunities, market trends, financial support, and technological breakthroughs. The royal commission's hope was for a transformation from isolated fishing outports to economically diverse electronic villages, towns and cities.

It is clear that the notion of technology as a saviour of rural communities is not new, nor has it been successful in creating a new economic base in rural Newfoundland and Labrador. As previously stated, several strategies have been developed in attempts to create a provincial knowledge based economy to replace the defunct natural cod resources that employed thousands of Newfoundlanders and Labradorians and had been abundant for hundreds of years. In terms of technological infrastructure, the SmartLabrador project is the largest of these efforts, and certainly the only one of its kind in the province. Telehealth, as one of five Smart Services provided by the organization, demonstrates the commitment of community economic development groups such as SmartLabrador to create sustainable services in all areas, not simply to develop a stronger economic base. This is an example of continued temporal bias (e.g. strong community ties and connection to a geographically located place) in the Labrador context.

Despite this desire to enable rural health service provision, it is also important to underscore the role of telehealth in creating an economically stable SmartLabrador

project. With such a small population, SmartLabrador cannot sustain itself on small scale use of videoconferencing. SmartLabrador had hoped that the two health boards in their region would begin to use a substantial amount of videoconferencing in order to cover some of the costs of maintaining the network. This has not occurred, leaving the project without a key source of anticipated income post-pilot project phase.

Although there have been several attempts to rejuvenate the Newfoundland and Labrador economy by investing in a variety of economic diversification strategies (e.g. aquaculture, tourism, offshore oil and gas and technological infrastructure), the unemployment rate in the region remains high. The province's population dropped by over 30,000 people between 1997 and 2000, with those leaving concentrated in the 15-29 age group. This accounts for a loss of over five percent of the population (Sinclair, 2002). Though patterns of youth out-migration have existed for decades, the current situation indicates that within a few years the vast majority of individuals in rural communities will be older and the population of these areas much smaller as fewer children are born.

This demographic shift creates challenges in service provision, especially in the areas of health care and education. As more citizens are in need of elder care and fewer children attend school in a given area, it becomes increasingly difficult to justify the large amount of money spent on servicing a small population. It is at this point that health care intersects with technology in creating a potentially sustainable rural community by enabling inexpensive distance care. Indeed, from an outside perspective, telehealth seems an ideal solution for small communities in need of health care services. However, as Suchman (1987) argues, the difference between plans and situated actions must be

explored in order to uncover the challenging reality of using video conferencing technology to mediate distance in health care.

Telehealth implies a change in the means of communication, a shift from one technological system (face-to-face interactions and telephone interactions) to another (videoconferencing). This shift parallels the Innisian argument of a shift from time binding technologies to space binding technologies. Innis (1994a) argues that the means of communication have been important in deciding the nature of societies, with oral societies bounded by time, and literate societies bounded by space. He is highly critical of the desire to control space, and argues that literate societies are inherently materialistic.

Therefore, according to Innis' argument, the nature of a spatially biased age based on mechanical means of production is fundamentally materialistic, and less connected with history and a sense of community than previous generations. Applying this argument to telehealth suggests that increased technological mediation in health care will result in less connection between health care providers and the people they serve, and that there will be an increased focus on the present, with less reflection on the history of the region. This may lead to a more fragmented way of understanding a health problem, rather than a more holistic approach where a locally based health professional can provide higher continuity of care. The counter to this suggestion is the argument that technologies that bridge distance actually allow for an increased connection between patient and provider as it can enable an ongoing relationship compared to the disjointed nature of sporadic travel to access health services. However, using an Innisian critique of telehealth offers an important word of caution in an often overly enthusiastic telehealth environment (Jennett & Andruchuk, 2001). Innis also argues that changes in technology

impact culture in several ways, changing "the structure of interests (the things thought about) by changing the character of symbols (the things thought with), and by changing the nature of the community (the arena in which thought developed)" (Carey, 1989, p.160).

It is not surprising that Labradorians came together to secure the SmartLabrador project due to the need for increased access to health care and other basic social services. Given the very real constraints of geographic isolation, one must question why citizens are committed to staying in the remote regions of Labrador. Innis (1940) argues that temporal biases serve as a counter to the constraints of space characteristic of the Labrador experience. Sinclair (2002) notes that despite the lack of services available to rural Labradorians, people are intimately attached to their communities. Quality of life issues such as closeness of family, friendship groups, a sense of freedom and access to nature were all cited by individuals as reasons for wanting to remain in their rural setting.

The close ties discussed above reflect the strength of Innis' concept of time bounded communities, but many do not see any alternative to leaving, despite their desire to remain in their rural environs. This is especially prevalent for individuals under the age of 25 (Sinclair, 2002). Innis' model, while an important tool in understanding the bias of a society at any given time, does not offer any practical means of maintaining the binds of time in increasingly compressed space. While this was not necessarily Innis' motivation, using this framework has limitations in a community partnership study such as this. For example, it is difficult to ascertain how understanding the biases of time and space could offer suggestions for improving the economic life in rural communities. Its strength is in its ability to highlight the central tensions between space and time. It is a

useful tool that helps to situate the local, regional and national contexts in terms of technology, communication and society within a framework for understanding Labrador's culture and the constraints SmartLabrador is facing.

Telehealth was incorporated as an essential part of the SmartLabrador demonstration project. Access to health care was considered a community priority, one that makes staying in a rural community more feasible. Essentially, the group wanted to use space binding technologies to ensure the ongoing bias of time, to ensure that people could access health services without having to leave their communities, enabling them to continue to live in areas with close family and social ties. However, in the health care context, the attempt to use a space binding technology (videoconferencing) to maintain the binds of time (strong social and community ties in rural communities) has had limited success.

While a mechanical age may be inherently materialistic, is it possible to find a reasonable balance between time binding technologies that lend stability and space binding technologies that emphasize change and placelessness? While it may be impossible to prove either case, stability between space and time bound cultures is difficult to achieve, as "compromises between the demands of a monopoly of space and a monopoly of time...[implies] ultimate instability and adjustments" (Innis, 1994c, p. 396). Labrador serves as an excellent example of this scenario, as it adjusts to a reduced number of jobs available in the fishery, and attempts to expand its technology sector. Efforts of the SmartLabrador project extend beyond telehealth, and include training in ICTs and other technology skills.

SmartLabrador exemplifies community based attempts to build a greater knowledge base around technology. However valuable Innis' critique of technology, the return to an orally based society in a digital age is unlikely, given the political and economic forces working to entrench the prominence of new ICTs in professional and personal practice. I will now examine the role of Canadian Internet policy in creating this broader political economic context.

The Connecting Canadians Context: Space, Telecommunication and the Canadian State

Labrador has changed drastically since the time of Innis' writings, but it remains a resource-based economy, with a large nickel deposit located at Voisey's Bay currently being mined (Government of Newfoundland and Labrador, 2004). I argue that Innis' analysis of the Newfoundland and Labrador case can be modified and applied to the current situation in Labrador, and used to examine the role of new technologies in the area's economic future, in order to develop a critical perspective on the federal government's telecommunications plan and its *Connecting Canadians* initiatives in the province.

As previously stated, Innis (1940) argues that because of its reliance on primary resources Newfoundland and Labrador was exceptionally vulnerable to the strains of capital intensive technology. Instead of capital intensive technologies of physical space like the railway that have been historically problematic, large fiscal investments are now required for the capital intensive technologies of virtual space. However, before the Labrador case can be discussed more fully, it is important to situate it in the Canadian telecommunications environment.

Clearly, the time boundedness of Labrador communities did not accelerate change, nor encourage the accumulation of wealth, two areas now being strongly advocated by federal telecommunications policy surrounding the Internet (Gutstein, 1999). Major connectivity documents project a utopian cultural shift to an information age where individuals are "limited only by imagination" (Hamel, 2000, p. 10) and e-business applications ensure a growth economy. Not surprisingly, the utopian visions of a limitless Internet world that generates wealth for all have not materialized, and the "tech fix" (Weinberg, 2003) has not come to pass. As a federal connectivity program provided the infrastructure for videoconferencing in telehealth, I will now briefly explore the history of Canadian telecommunications policy. I will then relate it to the positivist perspective of telehealth that emerges from many federal and provincial telehealth initiatives. Finally, I will begin to explore the realities of implementing telehealth in this broader policy context.

The ability to control space and overcome the barriers of geography has been of long-standing interest to Canadian policy makers. The construction of the Canadian National Railway was heralded by politicians as a means of creating national unity by connecting the country from East to West (Babe, 1990). The desire of policy makers to control time has been demonstrated by strong investment in telecommunications and distance mediating technologies. In the 1960s, parallels to the railway were made by ministers when speaking about satellites, and the term 'information highway,' though coined by the Clinton Administration in the United States, is strikingly similar to the preoccupation in Canadian telecommunications policy and industry with the ability to transcend the barriers of time and move easily through space.

Currently, many argue that new ICTs have the capacity to conquer the typical challenges of Canadian geography and population dispersion, breaking down the barriers of time and space that have been characteristic of the Canadian experience to date. However, Innis argues that the art of social policy is balancing the demands of time and space, to create equilibrium between utopian visions of the present day and romantic memories of the past (Carey, 1989).

Myth and Telecommunications in Canada

In keeping with the utopian visions of telehealth outlined in a variety of federal and provincial reports (e.g. the *Romanow Report* and the 2001-02 Annual Report of the Newfoundland and Labrador Ministry of Health and Community Services), Babe (1990) argues that Canadian telecommunication policy has been coloured by several mythologies. These include technical nationalism and technological dependence. A myth is a means of interpretation that "deprives the object of which it speaks of all history...nothing is produced, nothing is chosen: all one has to do is to possess these new objects from which all soiling trace of origin or choice has been removed" (Barthes, as cited in Babe, 1990, p. 4). Myths must be deconstructed when addressing how communication structures came into being, and what their existence implies (e.g. an elimination of geographic constraints to accessing health services). In this context, the myths of technical nationalism and technological dependence relate closely to how the SmartLabrador project is perceived by several key stakeholders. I will elaborate on these myths in the following paragraphs.

Technical nationalism is a mythology built on the belief that the Canadian nation exists by way of its communication structures (Babe, 1990). This position assumes that

nationhood derives from the development and use of industrial telecommunications tools. Babe argues that despite this romantic vision of telecommunications, these industrial structures grew through struggle for power and the development of agency rather than simply appearing without human interaction. While this may seem to critique Innis' theory of communication structures in Canadian development, it simply underlines the Innisian argument that the means of communication do not determine society, but bias the nature of a society.

While not denying the important role of communication structures in Canadian development and the Canadian nation, Babe (1990) critiques technical nationalism, emphasizing the role of human actors in creating the society in which we live, and pushing policy makers and industry to take responsibility for it. The mythology of Canadian life existing via the means of communication was highlighted in the Labrador context throughout the SmartLabrador funding proposal submitted to Industry Canada. Despite the emphasis on the centrality of technology to Labrador's future, the remote nature of Labrador makes it difficult to argue against the validity of these communities' desire for enhanced communication technologies.

Babe (1990) argues that the second mythology of Canadian telecommunications policy is technological dependence, which exists as a complement to technical nationalism's claim that Canada exists because of its communication structures, and that care should be taken to ensure Canada has adequate communication structures to facilitate this nationhood. Technological dependence assumes that society has few options regarding technological implementation. This implies that it is *technology*, not politics, struggle, or agency that controls which telecommunication policies must be

implemented. The myth of technological dependence is closely linked to technological determinism. Framed as a "cause-and-effect" theory of social change, determinism removes agency from the realms of the social, cultural and political, as technology develops in an autonomous sphere removed from human control (Winner, 2001).

The examination of Canadian telehealth practice clearly reveals a technologically determinist position. Examples include Ontario's *Rural and Northern Health Care Framework* and Saskatchewan's *Commission on Medicare*. These policy documents argue that, "while some health care services can be delivered in smaller communities, some form of networked system that links those communities with urban centres is inevitable" (Romanow, 2002, p. 164).

The dominance of the determinist perspective regarding technology does not apply only to health care. Rideout (2000) argues that rural Atlantic Canadians want increased access to ICTs as a part of creating sustainable communities in rural locales. These citizens feel that to avoid being left behind in the digital age, they must adapt to new technologies. This is similar to the strand of technological determinism that assumes technological developments are progressive, inevitable and irreversible, and that it is therefore the task of society to adjust to them (MacKenzie, 1999). This is not surprising given the exhaustion of natural resources in several areas and the change in the socio-demographic makeup of many rural communities. The business plan submitted by the Labrador I.T. Initiative to Industry Canada's Smart Communities competition is also very hopeful about the potential of new broadband technologies in the region:

> These enabling technologies build on many years of institution-building within our community. They will help us create an example to the world of how smart people, linked by good networks, can transform the

> challenges of distance and cultural diversity into opportunities for a dramatically enhanced social and economic life (Downer, 1999, p. 2).

Langdon Winner, a strong critic of technological determinism, argues that rather than being neutral and value-free, many technologies are inherently political. Instead of determining society, Winner (2001) argues that technology can shape society, but that the power of technology is dependent upon several factors in the larger environment. This argument agrees in part with the Innisian approach, though Winner would advocate for making politics and culture more integral to forming the technology, and not vice versa, as Innis (1994a) suggests. Despite theoretical deconstructions of the power of technology, discourse surrounding technology outside of the academic sphere is highly determinist. The Information Highway Advisory Council (IHAC) reports, the precursors to the federal *Connecting Canadians* program, discussed technology from a highly determinist perspective. This will be elaborated upon in the following pages. IHAC, as a founding document of Canadian Internet policy, is an important starting point for exploring SmartLabrador, as it grew from programs rooted in IHAC's recommendations.

Considering this bias towards the inevitability of technology or the dominance of space over time, I will now discuss the role of new information and communication technologies in relation to telehealth in Labrador. The geographic isolation of Labrador communities has served as a motivator for citizens to get online (personal communication, SmartLabrador staff, 3). Despite the efforts of federal policy to rejuvenate economies via investment in ICTs, levels of unemployment in the region have not seen any marked change since the implementation of these technologies (Sinclair, 2002). Though local employment levels have not changed, efforts to control time via these technologies have implications for industry, as telecommunications firms benefit

from public investment in their products for the supposed sake of Canadian unity and economic rejuvenation. However, the benefits for the region should not be dismissed, nor should the "people first" approach adopted by SmartLabrador be underestimated. The locally based project offers an alternative means of ICT implementation, one which focuses on meeting community priorities such as increased access to health services.

The Information Highway Advisory Council and Canadian Connectivity: Enacting the Myth of Technological Dependence

A larger policy discussion has been taking place over the last decade in relation to Canada's place on the Internet. The Information Highway Advisory Council (IHAC) produced key documents regarding Canada's future in relation to ICTs, which stipulated that Canada must have a secure and prominent place on the Internet to ensure a stable knowledge-based economy and, without explaining how, a strong Canadian culture in the information age (Canada, 1997).

The report included many recommendations, but was guided by three objectives mandated by the federal government. These objectives are: 1. job creation achieved by innovating and investing; 2. heightened cultural sovereignty and cultural identity; and 3. universal access by means of reasonable costs. IHAC added the principle of lifelong learning to this list (Canada, 1997). In addition to historic difficulties in creating Canadian telecommunications policy, IHAC was created in an environment with new challenges. Since the federal Department of Communication had been dissolved in 1993, there existed a new split between the "soft" cultural policy of broadcasting, which was under the jurisdiction of the new federal Ministry of Canadian Heritage, and the "hard" economic policy of telecommunications, relegated to Industry Canada. Abramson and

Raboy (1999) argue that this split makes the implementation of policy that balances industry with the public interest difficult, as it makes sense that a department devoted to the advancement of industry would lend a keener ear to private interests than public ones. They also attribute the split to a lack of coherence in policy as responsibility is spread out among different areas of government. What emerged was nothing more than a "haphazard policy environment mired in bureaucratic politics" (Abramson & Raboy, 1999, p. 778). The SmartLabrador project emerged as one of 10 Smart Community projects from this environment, and was constrained by the structure of the emergent policy environment, which focused on the emancipatory potential of ICTs.

Ironically, in an era of convergence in telecommunications there was a divergence in policy bodies, with IHAC stating that Canada must actively create a prominent online presence in order to ensure Canada's economic and cultural future. This demonstrates technical nationalism's claim that Canadians must participate in public life by utilizing the newest technologies available. Innis, however, argues that placing such emphasis on new technologies will actually disconnect people from their communities and traditional way of life.

The Internet's ability to bridge the traditional time-boundedness of Canadian communities through space has been offered as a new means of building a coherent national character, and, perhaps the most well developed mythology, a mechanism for securing a strong Canadian economy. The focus of existing Internet policy is on the opportunities for economic growth via the Internet (Gutstein, 1999). This is especially relevant to the Labrador context, as the Internet is framed as a new means of developing the region's languishing economy. But, as previously discussed, little change has been

marked in levels of employment since the implementation of the SmartLabrador project. Nor is it a realistic expectation that a community-based technology project be single-handedly capable of rejuvenating an economy. The SmartLabrador network has only been recently created, and the spinoffs of this project certainly are at a very early stage of development. Health is an important part of the SmartLabrador project, but it is only one of five Smart Services. Income from telehealth services is not sufficient to maintain the SmartLabrador network. Thus, telehealth and other technologically mediated services are essentially mutually dependent.

As has been previously discussed, the Canadian state has been very active in encouraging the development of digital networks, and has produced numerous policy documents concerning the Internet in Canada. Much like the corporate rhetoric of IBM and Microsoft, IHAC was rife with language of the new age of democracy and economic equality spurred on by the Internet. Inherent in this emancipation was the conquering of space. Key to the mythical power of the Internet is its ability to transcend time and space, to connect Canadians and move beyond the typical boundaries of transportation:

> No longer will distance pose an obstacle to economic development, social intercourse, learning, voluntary action, adequate health care, business success or full participation in society and Canada's national cultural dialogue (IHAC, 1997, p. 2).

Clearly the problem of space has been framed as a primary source of disconnection in Canadian social and cultural life, and the supposed conquering of space by the Internet is offered as a 'magic bullet' solution to typical problems that are in reality beyond the scope of any telecommunications infrastructure (Stelzer, 2002). Telehealth is no exception to this rule, and this phenomenon was replicated in the 2002 *Romanow Report*

and in the 2001-02 Newfoundland and Labrador Ministry of Health and Community Services Annual Report. As the data will demonstrate, technology does not work autonomously in this context. Users are involved in every step of the process, and the dominant perspective that assumes technology can solve human problems quickly and efficiently is unravelled in Chapter Four.

The motivations behind Canadian investment in the Internet are unclear, given the contradictions between nationalist rhetoric in the IHAC report and the internationalist reality of Canada's trade commitments and the report's actual recommendations. While the rhetoric of the final IHAC report seems to indicate that making Canada a highly connected nation will be beneficial to all citizens, the actions of the federal government with respect to telecommunications have had a much narrower focus on trade. Canada and its economic partners agreed to the neoliberal "state as catalyst" model of telecommunications at the 1995 G-7 meeting in Brussels. The state as catalyst model situates the state as a facilitator of market forces in telecommunications (Abramson & Raboy, 1999). It is clear that policy is not only concerned with the rejuvenation of a local economy, but the facilitation of large international corporate capital accruement. This model places the public interest under the rubric of consumer representatives, as the state acts as a facilitator of industry, rather than a regulator or director of social policy (Abramson & Raboy, 1999).

As this shift marked the transfer of policy from the national to the international arena, it is difficult to connect the motivations of Industry Canada primarily to Canadian economic development and not international trade. The result of neoliberal

telecommunications policy seems an unlikely bastion of rural sustainability, as Crow and Longford (2000, p. 224) argue:

> When the contents of the various IHAC reports and recommendations are examined in detail, the extent to which the Canadian state has been seduced by the ideology of digital restructuring becomes disturbingly clear.

Clearly, the dialectical mythologies of technical nationalism and technological dependence have influenced the development of this piece of Canadian telecommunications policy. In this context, the Internet is seen as a vehicle for economic rejuvenation. Despite the mythology of technical nationalism so prevalent in policy documents such as IHAC, the underlying goal of catalytic state actions for international markets must be recognized as a clear factor in determining the direction of Canadian Internet policy (Abramson & Raboy, 1999). In contrast, the community based efforts of the SmartLabrador project are somewhat antithetical to this project. With a locally based work force and community-based decision making as to which applications to develop, the SmartLabrador project is more than a simple cog in the wheel of the international telecommunications industry.

SmartLabrador and a Sustainable Network

As emancipatory mythologies of broadband and digital technologies abound in the corporate and policy spheres, a critical analysis of the technologies must now begin. Firstly, installing the broadband network required for high-speed Internet connections is expensive, with the SmartLabrador project having a total budget of $12 million. Notably, $500,000 of this money was immediately reclaimed by Industry Canada for administrative expenses (personal communication, SmartLabrador staff, 3). While this

funding has provided the initial human and technological resources to connect Labrador, making the network a sustainable entity post-demonstration project phase has proven to be one of the biggest challenges facing SmartLabrador (personal communication, SmartLabrador staff, 3).

Despite the obstacles that lie in their path, the SmartLabrador team is exceptionally skilled in writing grant applications, and should be duly recognized for their expertise. Rideout (2000) notes that this type of skill base favours some communities at the expense of others, leaving those with less capacity to secure funding with lower levels of services than communities with grant writing proficiency. This is the case in Labrador, where isolated parts of the region have a higher level of connectivity than their counterparts in many communities located on the island portion of the province of Newfoundland and Labrador. However, the lack of services traditionally available in Labrador and the exploitation of the region's resources for the benefit of other areas of the country (e.g., the multi-billion dollar Churchill Falls hydroelectric project, with profits belonging to Hydro Québec) can quickly silence arguments against Labrador accessing this federal technology initiative.

Beyond sustainability, the question of who will benefit from investments in new telehealth technologies must also be answered. Carey (1989, p. 164) argues that "literacy produces instability and inconsistency because the written tradition is participated in so unevenly." His comment about the nature of literacy can also be applied to digital communication via videoconferencing. Currently, wide gaps exist in ICT use, based on gender, age, income and geographic location. This digital divide tends towards cultural instability as many do not have the means to participate, or moreover, do not have the

desire to participate in new means of communication (Reddick, Boucher & Manon, 2002; Clement & Shade, 1998; Rideout, 2000). New technologies can actually make basic oral communication more difficult, and act as major barriers for those attempting to participate in an information age (Carey, 1989). In the case of telehealth, health care workers have differing levels of technological proficiency and comfort, which may encourage them to or inhibit them from using the new pan-Labrador videoconferencing system for health care purposes.

It is clear that Canadian telecommunications policy has been influenced by the myths of technical nationalism and technological dependence. Although there have been considerable monies spent on Canadian connectivity, little attention has been paid to who genuinely benefits from the implementation of these technologies. Nor has the long term sustainability of connectivity projects such as Smart Communities been adequately considered. These issues must be brought into the policy arena to ensure the hundreds of millions spent on making Canada an international leader in connectivity are not wasted as these programs end, and levels of connectivity in rural and remote environments decrease with their termination. In order to better understand the situated role of ICTs, I will now turn to the structures which constrain the SmartLabrador project.

Structuration

Structuration is central to a political economy of communication. Mosco (1996, p. 212) defines structuration as "a process by which structures are constituted out of human agency, even as they provide the very 'medium' of that constitution." According to structuration theory, social life is mutually constituted of structure and agency. Structuration thus involves the circumstances governing the stability or change of

structures and thus the reproduction of social systems (Giddens, 1984). As such, structures dictate to a certain extent what happens in social life, although agents can act in ways which change or evolve structures. The data demonstrates how this conceptualization of action relates to what certain actors were able to accomplish in their attempts to increase the use of videoconferencing in the Labrador health system.

Giddens (1984) outlines the importance of social production and reproduction in the greater reproduction of the entire social system. As such, structuration is fundamentally concerned with the "rules and resources drawn upon in the production and reproduction of social life [which] are at the same time the means of system reproduction" (Giddens, 1984, p.18). In the case of health care, workers in Labrador face a set of rules which include a heavy workload, limited resources, and isolation. SmartLabrador, while enabled by the resource of long term partnerships in the Labrador region, faced the challenge of working within the confines of a specific federal funding program. Health administrators have long worked in the context of high levels of staff turnover and fiscal constraints (personal communication, nurse, 6). I thus take socio-technical issues as part of the larger set of rules and resources influencing why there has been limited telehealth use in the Labrador region, despite the anticipation of high usage rates by SmartLabrador staff.

Structuration emphasizes social change, which is viewed as a continual and ubiquitous process of evolving and changing structures in which human agents act, making and remaking these structures as they do so. Key to this approach is the rejection of the idea that agency can be examined separately from structure. In the Labrador case, this underlines the futility of examining the agency of technology workers and health care

staff without first understanding the institutions in which they work. Indeed, agency is a complex social phenomenon which requires definition. Giddens (1984, p. 9) provides insight with this characterization:

> Agency refers not to the intentions people have in doing things but to their capability of doing those things in the first place...agency concerns events of which an individual is the perpetrator, in the sense that the individual could, at any phase of a given sequence of conduct, have acted differently.

SmartLabrador management and workers, while working with the intentions of creating a more efficient workday for health care staff and enhanced access to medical services for Labrador citizens, did not have the power to make this a widespread reality in the health care context, a phenomenon elaborated upon in Chapter Four.

Inherent in agency is the notion of choice, the ability for an individual to act in different ways in a given context. In order for an actor to have agency, he or she must be able to "make a difference" (Giddens, 1984, p.14) in a situation or sequence of events. Essentially, the actor must be able to exercise some power in the situation. The actor ceases to be an agent when he or she loses the ability to have an impact on the outcome of a given situation. In this context, "power is very often defined in terms of intent or the will, as the capacity to achieve desired and intended outcomes" (Giddens, p. 15). This framing is a useful tool for understanding the dynamics of implementing telehealth, as it demonstrates how actors, despite their intentions to change the way in which certain tasks are performed, may have no agency to make such a change, and are in fact not able to accomplish their intended goal.

Additionally, it is important to think about structures (in this case, the two organizations exist within the larger governmental dossiers of health and industry) as the main means of ordering the social relations between SmartLabrador and Health Labrador.

Giddens (1989, p. 25) states: "the structural properties of social systems are both medium and outcome of the practices they recursively organise . . .Structure is not to be equated with constraint but is always both constraining and enabling." This perspective does not, however, place structure outside the domain of human interaction. Fundamentally, structure is created through the process of human interaction, and does not occur externally to it (Giddens).

Structuration theory has also been applied to technology studies. A structurational perspective on technology explores technological development as a social process that "results in structures (rules and resources) being embedded within the technology" (Orlikowski, 2000, p. 405). However, structurational models of technology do not only examine the rules and resources of a given technology, but how the environmental structures in which a technology is implemented influence users' interaction with the technology. For example, the extreme winter weather conditions dictated that health care workers interact with videoconferencing technology not only as users, but also as systems technicians.

The lack of uptake of videoconferencing technology demonstrates health care workers' refusal to invest the large amount of time planning when the technology would be used. The designers of the SmartLabrador project certainly did not anticipate the low levels of use of the system in the health care sector, and the interactions with the technology were often different than the grassroots technology group had intended. While SmartLabrador anticipated new means of health care delivery, they did not foresee nurses working on clinic rooftops fixing satellite dishes (personal communication, nurse, 9) nor a privacy scare that broke down levels of trust between the health board and

SmartLabrador early in the telehealth pilot project (personal communication, health administrator, 8).

Structuration theory argues that routines are important in social life, and the very process of changing routines is difficult. Telehealth is problematic for this very reason, as it involves changing routines of clinical practice that have existed for many years. Despite a culture of change in the macro health policy environment, the micro level of situated care is resistant to change. Work practice, to which I now turn, links structuration to the meso and micro level experiences of health care workers and technologists in Labrador. As Balka (2002) argues, macro level changes are well explored through structuration, but work practice must be investigated in order to understand how these broader changes impact workers on the meso and micro levels. This will facilitate a discussion of these ideas in relation to the data presented in Chapter Four.

Work Practice and Socio-technical Theory

While structuration is a macro framework of analysis, work practice studies provide insights at the meso and micro levels. Grint and Woolgar (1997) have argued that the social and the technical must be analysed together when considering technological systems. Thus, understanding a social system in a workplace is insufficient to understanding that workplace's relationship to technology. Similarly, examining technology without simultaneously studying the social context in which it is situated will reveal little about how the technology is actually used. Suchman (1987) argues that technologies must be examined in the contexts in which they are used in order to understand how they really function and what their role is in a given context. Inherent in these arguments is that the *structures* within which these technologies are situated will

influence how, when and why they are used. This perspective frames technology as social practice (Suchman, Blomberg, Orr & Trigg, 1999). Telehealth is one such social practice involving health care providers, patients and technology.

Blomberg (1987) argues that it is not so much the design or features of a technology that facilitates or disables its use, but actually the ways in which information about it is exchanged among users in a given context. This perspective is premised on the idea that a researcher must "locate artifacts within the sites and the relations of their everyday use" (Suchman et al., 1999, p. 397). Grint and Woolgar (1997) voice a strong critique of conventional analysis of technological implementation which understands technology as a cause and effect/action and reaction relationship between machine and worker. As the SmartLabrador-Health Labrador telehealth situation demonstrates, the relationship between technology and work practice is not linear, nor is it uncomplicated. Grint and Woolgar are quick to add, however, that despite their critique, this technicist approach is dominant in current organizational change and technical literature.

Telehealth applications such as real-time physician-patient consultations serve as a good example of the complicated relationship between people and technology. Rather than a simple system where new technology can be made available and serve as a quick solution to accessibility of health care, "what we have is a technological and a social form which are interdependent" (Grint and Woolgar, 1997 p. 122). This interdependence is central to using telehealth: while a videoconferencing system is in itself a rather simple technology, the ways in which knowledge about the new tool is exchanged within a work place structure impact its use. However, I am not stating that using telehealth is simply a question of choosing the right means of disseminating information. Such an argument

would ignore problems that are inherent to the technology itself, creating a determinist argument. The challenge of using telehealth relates to power dynamics and training issues, which I discuss at greater length in Chapter Four.

The question of skill emerged from the data in several cases. There has been a great deal written on the deskilling effects of technology from Braverman (1998), Crow and Longford (2000), and many others. On the opposite pole are writers such as Bell (1973) and Strassman (1985) who argue that technology has a reskilling or enskilling impact in that it requires the user to learn new skills and become a more comprehensive employee. Grint and Woolgar (1997), however, argue that technology does not fall into either of these categories, but moves between the two. It has the capacity to deskill, as in the case of nurses who may no longer need to use their entire repertoire of expertise due to their new access to physicians via videoconference, but it is also a sort of reskilling, in that it allows for new access to continuing medical education, a duality I return to in Chapter Four. It is important to situate telehealth within an overarching perspective on technology, which reinforces the notion that increased levels of efficiency will be achieved by using increased levels of technology. This perspective coloured nearly all interviews undertaken for the research project. Given the lack of evidence to support this claim, one must question why the increased use of technology is supported so strongly in the policy and lay contexts, especially when one considers the austerity the health system now faces.

Karasti (2001) argues for the importance of integrating the work practices of the end user into technology design. Understanding the ways in which work is performed, she argues, should be considered essential when new technologies develop. While ideally

health care workers, notably the nurses, physicians and administrative assistants who work most closely with the videoconferencing system, would have been involved in its design, this is not a common model of technology development in North America. While Karasti argues that work practice is important to system design, I acknowledge that SmartLabrador had virtually no opportunity to intervene in the design of the Video Team stations which are used for videoconferencing. Instead, I advocate that work practice must be considered as a vital part of telehealth *program* design. Understanding the rules and resources available to health care workers can enhance the ways in which telehealth operates. For example, recognizing the unpredictable nature of work in primary health care would make it important to create a telehealth system that is flexible and able to cope with the competing demands for health workers' time.

Conclusion

This chapter provides a theoretical framework for the thesis. By exploring technology and spatialization from an Innisian perspective, I examined the impact of new technologies on communities, and related Innis' thesis to the history of technology in Labrador. I then discussed the SmartLabrador project in relation to Canadian telecommunications policy and situate that policy within Babe's (1990) technological myths. I also related policy to the sustainability of connectivity in Canada following the completion of federal connectivity programs. Following this section, I discussed structuration as it relates to telehealth. As SmartLabrador and Health Labrador must work together in order for telehealth to work, the relationships between these organizations are central to how telehealth emerged in the Labrador context. Finally, I explored work practice in relation to the day-to-day situated use of telehealth.

Labrador has faced many challenges since the early 1990s, when one of its main industries, the cod fishery, was closed. Investment in ICTs has been hailed as one means of reviving the languishing economy. However, questions regarding the shift from temporal bias to spatial bias remain. The capacities of space binding technologies to bridge geographic space are being used as means of preserving time-bounded communities by attempting to enhance services in rural and remote areas. Inherent in these efforts are the myths that technology will build a stronger sense of community, and that rural communities are highly dependent on what technology dictates is possible. However, despite this seeming lack of choice regarding technology, ICT implementation for the purpose of rural sustainability has been problematic.

The myths of technical nationalism and technological dependence that have coloured Canadian telecommunications policy have now become part of the superstructure in which the SmartLabrador project exists. *Connecting Canadians*, from which SmartLabrador grew, was derived from the larger policy context of IHAC, which conceptualized the Internet as a means of building national character, and more importantly for this case study, situated Canada's economic, social and cultural future as fundamentally reliant on Internet enabled communication. However, what this highly determinist policy environment does not offer is the crucial component of sustainability. Without core funding, SmartLabrador's future is not clear. With a population of fewer than 30,000 people, it is unlikely that SmartLabrador will be sustainable in the long term without government funding.

SmartLabrador's desire to develop telehealth services in Labrador was met with several challenges along the way. It is clear that the structure in which a technology is

situated has a great deal of influence over the ways in which it is used. However, while this seems to suggest that the social shaping of technology is the prime element of how technology is used, it is not simply the social structure, but the organizational structure that influences what actors choose to do in a given situation.

Chapter Three:
Methods

Introduction

Berg (2001) argues that subjective disclosures are important to provide insight into the research project. It is my hope that this chapter will not only reveal insights into my data collection, but will provide the reader with a small snapshot of the research experience. I will attempt to convey a better understanding of life in Labrador from a research perspective, and the situated reality of conducting fieldwork in rural and remote environments. This research was conducted as part of a larger Social Science and Humanities Research Council Standard Grant, *From Work Practice to Public Policy: Case Studies of the Canadian Health Infostructure.*

The chapter describes the processes involved in the research design and data collection. The field of technology assessment served as an important epistemological framework in this process. The study was informed by the assessment literature, especially feminist perspectives on technology assessment, which emphasize looking at the context in which a given technology is used (Bush, 1983; Morgall, 1993). In this chapter, I first review the technology assessment process, before moving on to discuss the methods employed. I also review my integration into the field setting in order to give the reader a snapshot of my experience in Labrador.

The ethnographic method of in depth interviewing was the primary source of data collection, and I elaborate on ethnography as a preamble to my actual data collection. I

then discuss the nature of the interviews, and the various stakeholder groups with whom I spoke. Participant observation was also used, but little data was collected due to time constraints and the challenges of conducting an interorganizational study. I first discuss my integration into the field setting, the evolution of my methods, and then outline each of the methodologies I used in detail. Finally, I explore limitations of the research design and recommendations for future field research in this domain.

Technology Assessment

Many meanings are assigned to technology assessment. These meanings have been grouped into two broad categories: institutional level (supported by a larger organization) and individual level (done solely by one person) views of technology assessment. Technology assessment must be supported by an institution with agency (e.g. the federal or provincial government) in order to be a successful mechanism for choosing appropriate technology and a political tool for regulating or banning a dangerous technology. For example, while it is important for the lay user to evaluate a technology before introducing it into the home, the same user may not have the power to decide whether or not to introduce a new technology into her workplace, as she may not be in a position of authority in deciding which technologies are made part of the working environment. Inherent in technology assessment is needs assessment, or an analysis of whether a technology should be introduced in a given environment. Noorani and Picot (2001) argue that needs assessment is an area frequently ignored in the creation of telehealth programs.

Morgall (1993) argues that there are varied approaches to technology assessment within the institutionalized field. Some institutions, such as the now defunct Office of

Technology Assessment (OTA) in the United States are established for the explicit purpose of evaluating technology. Other agencies engage in technology assessment by integrating it into the general research budget. This assumes that technology assessment should be a part of the overall research goal. Morgall (p. 41) refers to this as "implicit" technology assessment. In the case of implicit technology assessment, funds are generally not designated for the assessment process, but are nonetheless expected to be devoted to assessing technology. Though efforts were made to establish technology assessment offices in countries such as France and Germany, political pressures to limit the strength of parliament overrode the desire to create such bodies.

As discussed above, many developed countries do not have a specific Office of Technology Assessment. Despite this resistance to general technology assessment offices, health technology assessment emerged as an institutional entity in the 1980s (Morgall, 1993). This was justified by the rapid pace of change in medical technology, and the shift within the medical profession to become more dependent on technology. In addition, the percentage of gross national product (GNP) being spent on health was increasing, making it ever more important to industrialized nations to attempt to manage health care costs. The Canadian Coordinating Office of Health Technology Assessment (CCOHTA) fills an assessment role in the Canadian context, and was a useful source when conducting a literature review for this thesis.

While CCOHTA serves as a federal assessment agency, there is a lack of community based technology evaluation in Canada's health system. Romanow (2002) recommends expanding technology assessments to understand the broader context in which the technology will be implemented. The report states:

> Health technology assessments are often not sufficiently comprehensive...because they fail to fully consider the social, legal and ethical implications of the use of health technologies (p. 84).

Medical professionals were highly involved in the separation of medical technology assessment from the general assessment rubric. Here, Morgall (1993) argues that physicians guarantee their position as key players in determining health technology policy, and can be seen as creating a forum for self-regulation. With the creation of health technology assessments, physicians were added to the technology assessment team, typically comprised of engineers, technicians and economists. Although team members are clearly experts in their given fields, the lay user (the patient) has not typically been given the opportunity to participate in the evaluation process. However, Bush (1983) argues that assessing technology in the user environment is crucial to understanding the constraining and enabling features of a given technology. Shaw (2002) also acknowledges the ongoing conflict over *how* ICTs in health care should be evaluated, and argues that a mix of quantitative and qualitative methods be used when evaluating how new technologies are used in the health system. This thesis begins to fill the qualitative gap in the Canadian health context.

Bush's (1983) perspective on the user was a key guide in the research design. According to her model, technology operates within four contexts:

1. *The design or developmental context* which includes all the decisions, material, personnel, processes, and systems necessary to create tools and techniques from the raw materials.

2. *The user context* which includes all the motivations, intentions, advantages, and adjustments called into play by the use of particular techniques or tools.

3. *The environmental context* that describes non-specific physical surroundings in which a technology or tool is developed and used.

4. *The cultural context* which includes all the norms, values, myths, aspirations, laws and interactions of the society of which the tool or technique is a part. (p. 157, italics in original).

While it was beyond the scope of this thesis to examine the design context of videoconferencing, this research situates videoconferencing technology in its user, environmental and cultural contexts in the Labrador region. Results from this case study are not generalizable, but they provide insight into the challenges facing health care providers and community development stakeholders when attempting to implement a new technological system.

Non-institutionalized technology assessment, of which this research is part, in contrast with the institutionalized form, has increased with the rise of special interest groups. These groups include labour unions, non-governmental organizations, and a host of others. Non-institutionalized technology assessment will typically attempt to address a specific technological problem, or a set of related problems, in order to maximize the impact of the evaluation. These efforts can be directed at government, the private sector and the public (Morgall, 1993). Partnership between researcher and community was fundamental to this work. As a researcher, I engaged with a community development group to assess the use of videoconferencing technology for telehealth use. Their questions were essential to the framing of my research.

Choice of Methods and Research Design

Having addressed my critical stance towards technology assessment, I now link technology assessment to my study of telehealth. This research began with full time

fieldwork on the case study of telehealth in Labrador, conducted in the summer of 2003. Fetterman (1998) argues that fieldwork is central to any ethnographic research design. Ethnography allows the researcher to describe a group based on several methods. To limit this range of methods for the purposes of the fieldwork, a review of the telehealth literature (presented in the introductory chapter) was conducted before determining the research design.

There has been very little written about telehealth from a communication perspective, although several government reports and corporate documents address telehealth. As previously discussed, several key government documents (e.g. the federal Romanow Report, and the provincial 2001-2002 Annual Report of the Department of Health and Community Services, Newfoundland and Labrador) were very supportive of development of telehealth applications, and while many dealt with the fiscal viability of telehealth, the contextual challenges of implementing telehealth were left largely unaddressed.

Additionally, the ways in which telehealth is being used have not been clearly outlined. This demonstrates the need for 'how' and 'why' questions to be asked in telehealth research, and motivated my choice of methods in the project's research design, which were also influenced by my training in qualitative methods. Indeed, Yin (1984) argues that the questions 'how' and 'why' are suited to case study research, and that case studies are well suited to thesis work in the social sciences.

The case study uses many of the same methods as history, but also employs observation and interviewing. Yin (1984, p. 20) states, "the case study's unique strength is its ability to deal with a full variety of evidence – documents, artifacts, interviews, and

observations." When presented with the opportunity to conduct field studies with the SmartLabrador initiative, Yin's work, in addition to discussions with SmartLabrador and the literature review, guided the decision to use two major methods, interviews and observation. I then incorporated quantitative methods into my research design. These were added to supplement the planned qualitative work for evaluation purposes, a part of the project requested by the community partner. However, as I will discuss later, the unpredictable nature of fieldwork required changes to the planned methods.

I examined the case from a micro/meso/macro perspective, an approach developed by Balka (2002). Micro data was collected through interviews and observations at the clinic and hospital levels; meso data collected from interviews with health care management; and macro data was collected by mapping the actor network of Newfoundland and Labrador health information policy.

Fieldwork was conducted between May and August of 2003, and was based at multiple sites in Newfoundland and Labrador. The main sites were Goose Bay and Forteau in the Labrador region, and St. John's, the provincial capital. Labrador field sites included the Smart Labrador offices in Forteau and Goose Bay, one of the major hospitals serving the Labrador community, and four coastal clinics. Additional interview data was collected at Memorial University of Newfoundland's Telehealth and Educational Technology Resources Agency (TETRA), and documents for policy mapping were gathered at the Centre for Newfoundland Studies at Memorial University. A series of 22 interviews was carried out throughout the Labrador region and in St. John's. In addition, a very limited amount of observational work (discussed later in this chapter) was done in Goose Bay.

Integration into the field setting

Dealing with the social experience of marginality is an initial challenge of conducting field research (Shaffir, Dietz & Stebbins, 1994). As pack ice remained in the straight of Belle Isle at the proposed start date of ferry service between the island of Newfoundland and mainland Labrador, I was required to travel to Forteau by cargo plane. Upon arrival I was greeted by the executive director of SmartLabrador and the host of the bed and breakfast at which I stayed throughout my time in Labrador. While working in a community of five hundred people, I lived close by in a community of seven inhabitants. Although I am accustomed to small communities and Newfoundland and Labrador culture, I still required time to adjust to the shift from living in a major Canadian city to an area which was accessible only by plane at that time of year. Shaffir, Dietz and Stebbins refer to this as a form of culture shock, where a researcher feels anxiety resulting from displacement from typical cues and social norms. Despite this feeling, the relaxed work environment of SmartLabrador, events for national Information Technology Week, and the 'home away from home' atmosphere of my accommodation made my marginality less pronounced, and I settled into a comfortable position as the 'research student,' the 'student here on a work term' and the 'student working with SmartLabrador.'

Berg (2001) argues that the researcher's attitude is a key part of the eventual results of the project, and cites Marza (1969) in saying that it is important to "enter appreciating the situations rather than intending to correct them" (p. 139-140). In doing so, empathy for and understanding of what is happening in the research environment are paramount. This was a concept I reminded myself of throughout the research process.

This advice was especially helpful in working between two different sectors (technology and community economic development with SmartLabrador and health care with Health Labrador). As a researcher working from outside of the health care field and from outside the rural setting, it was important for me to remind myself to not project my opinions about technology onto the research. My "way of seeing" was crucial to the qualitative nature of the research (Berg, 2001, p. 139). Being open to how interviewees felt about technology was important in order for me to gather data about how they use videoconferencing and what they think about using new technologies to deliver services and access information from a distance. Further to this, Strauss and Corbin's (1998) conceptualisation of sensitivity to data helped me to understand that telehealth means different things to different people (e.g. community development to SmartLabrador staff, a technology that is not entirely reliable to Goose Bay physicians and one small piece of the work day puzzle for administrative assistants).

Despite this need for appreciation, it was important for me to recognize my position as neither neutral nor value free. As a technology studies student, I am sceptical of technology's capacity to create change in health services. Additionally, I live relatively isolated from 'real life' pressures on rural communities. As an islander from a larger centre of the province, my first hand understanding of the challenges of post-cod moratorium life in Labrador was limited. I had to negotiate my place as an outsider with no real experience in the Labrador context. However, it needs to be recognized that the people of SmartLabrador, Health Labrador and the Labrador Straits did their utmost to facilitate my research and ensure I had a productive and enjoyable time in Labrador. Their efforts were successful.

My situated understanding of Labrador was shaped in part by the recent closure of the cod fishery in the province, a drastically reduced version of the former cod industry. The closure was marked by frustration and several protests throughout the Labrador Straits. Living with a retired fishing family whose boat had been passed on to the next generation, I was party to many dinner conversations and evenings of open line radio discussing the tragedy of the lost resource, and the intense dissatisfaction of many people with the Department of Fisheries and Oceans' attempt to manage (or as many said, mismanage) the cod stocks. Within a few weeks I felt that I had a better contextual understanding of the environment in which I would spend the following two months.

Justification of Methods

Strauss and Corbin (1998) argue that methods of data collection must be chosen based on the situational demands of a research project, and that methods act as a means of creating a 'flow of work' that changes and develops over the course of the research. As fieldwork must vary with the constraints of the research environment, the planned techniques varied from the methods I was able to employ in gathering data.

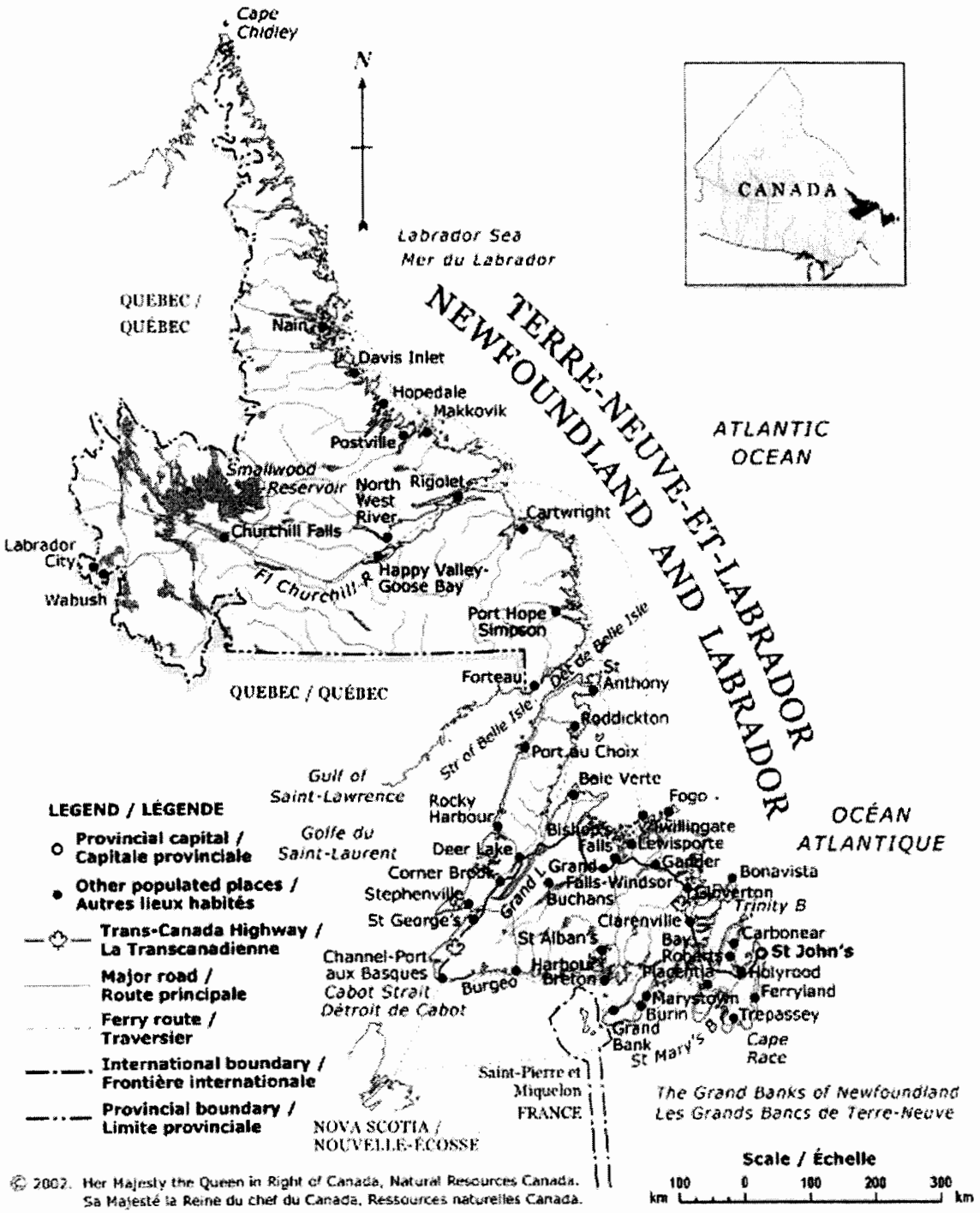
The research process required ethics clearances for three separate organizations in addition to previously attained ethics approval from Simon Fraser University. While I was forewarned about difficulties in accessing people during the summer, I naïvely did not anticipate the delay in one ethics approval because the ethics committee of one organization does not meet during the summer months. I did not receive clearance from this organization, and I was unable to complete that portion of the planned fieldwork prior to leaving Labrador. However, my situation has led to a discussion at the health board in question about an abridged ethics process for low risk studies such as my own.

While I originally anticipated triangulated data from interviews, observation and survey data from telehealth users, statistical validity could not be achieved due to the small sample size (N). Given the small number of health care professionals in Labrador, it would be impossible to analyse the data to yield statistically significant results. This is a problem that has been experienced by other health service researchers in the area (Cornish, Church, Callahan, Bethune, Robbins & Miller, 2003). Research techniques evolved from a planned mix of qualitative and quantitative techniques to exclusively qualitative data collection. The research design changed significantly over the course of the project, in keeping with Strauss and Corbin's (1998, p. 30) assertion that research is a "circular process, one that involves a lot of going back and forth and around before finally reaching one's goal." Allowing parts of the research design to emerge during the course of the project permitted the fieldwork to respond to the contextual challenges of doing health services research with a small population in a large and geographically isolated area.

Rather than attempt to use a survey for such a small sample, I focused the first two months of fieldwork on interviewing. This enabled the flow of research to continue, with data collected from in depth interviews with administrative assistants, nurses, physicians and middle and upper management at health centres and telehealth facilities. This in depth qualitative data was better suited to the unique needs of the Labrador region. For example, several coastal communities are connected only by gravel road, others have only summer water access and year round weather permitting air access. Goose Bay, however, has a complete hospital facility, paved roads and air, water and road access. Qualitative methods allowed for the different experiences of these

communities to emerge. Despite the change in methods, triangulation was achieved by adding documentary analysis of provincial health information policy to the fieldwork. The following map provides context regarding where interviews were conducted.

Figure 1 Political Map of Newfoundland and Labrador
Source: Atlas of Canada, 2004. (Used by permission of The Atlas of Canada. http://atlas.gc.ca © 2004, Her Majesty the Queen in Right of Canada with permission of Natural Resources Canada).



Interviews: building a dialogue

Following the change in methods, in depth interviews were the main method of data collection. I conducted semi-structured interviews that ranged from fifteen minutes to over an hour in duration. The interviews were conducted in batches, based around travel to various regions, including Goose Bay, Forteau, and St. John's. St. John's was chosen as an additional site as it is the home of the province's biggest health centre and Telehealth and Educational Technology Resources Agency (TETRA), based at Memorial University's medical school. All communities except St. John's are located in Labrador.

Networking was a crucial element of the interview process. Upon arrival in Labrador, I was introduced via email and conference call to several telehealth stakeholders in the region. The introductions were facilitated by SmartLabrador's executive director and helped me to make contacts with health care workers and TETRA staff. This allowed me to schedule initial interviews in Goose Bay. While there, I was referred by several key interviewees to other individuals within Health Labrador who would be able to provide me with insights into the research problem. Berg (2001) refers to these individuals as guides; people who can bring a researcher deeper into a field site when she or he begins exploration there. He also notes the importance of informing guides of their value in conducting the research. Certainly, the role of two key guides enhanced my access to interviewees in Goose Bay significantly. This guide system continued to work as a human chain. When I had completed an interview with one person, I was frequently escorted to another office to meet another health care worker. A key introduction at a distance education session allowed me to secure two very valuable interviews.

This snowballing role of guides was also important in Forteau. I was introduced to the SmartLabrador team by the executive director, and developed a working and social relationship with the staff. These introductions allowed me to establish an interpersonal rapport that helped to overcome the problem of interviewer dominance and respondent acquiescence.

Figure 2 Distribution of interviews by community and occupation

Community	Number and Occupations Interviewed
Black Tickle	1 Nurse
Forteau	1 SmartLabrador Fieldworker 2 SmartLabrador Managers
Goose Bay	1 Smart Labrador Fieldworker 1 Administrative Assistant 3 Physicians 3 Nurses (all were also acting managers) 1 Health Board Executive
Hopedale	1 Nurse
Labrador City	1 Nurse
Makkovik	1 Nurse
Rigolet	1 Nurse
St. John's	2 TETRA Staff 1 Health Information Policy Expert
Community Total: 8	Interview Total: 20

Interviews were conducted from Mishler's (1986) perspective of interviewing as a form of narrative. Interviews were not conceptualised as a stimulus-response exchange, but as a way for stakeholders to tell their story regarding technology and rural and remote access to health care. Mishler argues that the problem of shared meaning between researchers and subjects is not easily solved, and that this question of meaning cannot be resolved by "flat assertions and ad hoc assumptions but requires systematic analysis, an explicit theory of relations between speech and meaning, and an understanding of interviews as jointly produced discourse" (p. 43). He also argues that a contextual understanding is fundamental and that "interviewers and respondents in the give-and-take of the interview must provide the context for them to continue talking together" (p. 46).

The conceptualisation of the interview as a speech event guided my work. Often interviews would move from the interview schedule to other areas rather quickly, as the interviewees expressed interest in discussing other domains of their work. For example, one nurse, following a conversation about technology in his work which lasted approximately five minutes, began discussing the issues of poverty, isolation and the lack of access to physicians as his major challenges at work. While I did not initially intend for the discussion to move in that direction so quickly, it was an excellent means for me to garner an enhanced understanding of his concerns.

Interviewing can be framed as a joint construction of meaning and as an arena for storytelling. The proposition that interviewees create meaning and communicate their understanding of an event or set of experiences by telling a story guided the interviews that were conducted. Mishler (1986, p. 74) writes:

> The respondent/narrator sets the scene for us, introduces characters and describes their actions, specifies events and their relations over time, explicates a significant conflict and its resolution, and tells us the point of the story.

Allowing respondents to tell their story allowed me to gather a more holistic perspective on what respondents saw as important with regards to technology in their work. As an outsider, their willingness to do so painted vivid pictures of the challenges of implementing telehealth. The metaphor of "two silos," one representing Health Labrador and the other SmartLabrador, came from a particularly intriguing interview. Other stories, like emergency response efforts in an isolated area and colourful tales of staying in hostels to visit a doctor were poignant and informative. This revealed several areas that would have been left otherwise unexplored in the thesis, such as basic population health risks that were repeatedly underlined as the main problems in Labrador, especially in remote areas of the region. This approach required the interviewer to give the respondent ample time to respond to questions, and allowed them to speak for extended periods of time, which helped me to better understand the justifications for creating telehealth services.

My role as the interviewer was as an audience for the respondent: I was the person to whom this story was being told. While this approach was somewhat limited by telephone interviews, the narratives that emerged from face-to-face interviews were fascinating accounts of current attempts to implement telehealth in the Labrador context, and the reasons why distance mediating technologies did not work as planned. Upon reviewing each of the transcripts, and referring back to audio recordings of the interviews, it is clear that the barriers and potential of telehealth were related back to me as stories. These stories were not created by the respondent alone, but were influenced by

my questions, nonverbal cues, topic initiation and how I listened to the interviewee. As such, the interview stories were jointly produced between the researcher and the respondent.

As videoconferencing has only been available in most areas of Labrador since SmartLabrador completed its network in 2002, the question of meaning and interpretation of questions was a problem that I grappled with during design of the interview schedule and the progression of interviews. Some groups were more versed in videoconferencing than others, and often nurses varied in their knowledge of videoconferencing between clinics. Knowledge of the system also varied greatly between management and workers. Such variance made the process of deciding which questions to ask a challenging task. It also required me to be very flexible in how I asked questions, as I did not want to have an inappropriately placed technical question reduce the confidence an interviewee had in her or his response. However, despite this effort and others made throughout all my interviews, my nonverbal cues, questions and pace of speech acted as implicit instructions to the respondent regarding what she or he had said (Mishler, 1986). I attempted to allow respondents as much time as they wanted to answer each question, but this was constrained to a large extent by their work demands, especially in the case of coastal nurses.

Constructing a context and creating shared meaning was difficult in telephone interviews, as I was not able to give respondents a face to recognize, nor was I able to use the non-verbal cues of the respondents to determine when to press on with questions or when to move on to another area of discussion. Technologically mediated communication via the telephone limited the flow of the conversation and in turn, some of the meaning

that I was able to glean from interviews. Ideally, these meetings would have been face-to-face. The value of material generated via phone interviews was also constrained by competing demands for people's time in hospital and clinical settings. This reflects the busy nature of work in rural health care. Interviews were conducted in person whenever possible. As several communities in Labrador are accessible only by plane or coastal boat in the summer season, I conducted four interviews with coastal nurses over the telephone. Costs prohibited my travelling to speak with them in person.

These clinics often have a very small staff composed generally of one to two nurses, a personal care attendant and a maintenance person. The small staff meant that an "all hands on deck" approach is required to deal with busy situations in the clinic, and in turn, that interviews with me be kept short and done at a time when the clinic was relatively quiet. This necessitated frequently rescheduling interviews (often for after clinic hours) and asking a limited number of key questions. As I was not able to record telephone interviews, I relied solely on written notes and promptly wrote up the notes I had taken and my reflections about the interviews directly after completing them.

However, despite these constraints, clinic staff were exceptionally generous with their time. When I asked one coastal nurse if an interview was going to make her late leaving work, she commented that her work often kept her late and she did not mind staying to help me out. While I was unable to offer interviewees monetary compensation for their time, Berg (2001, p. 81) argues that interviewees feel a type of "intangible yet intrinsic reward" when they discuss something that matters to them with a researcher.

Regardless of this intrinsic reward and the generosity of interviewees with their time, other barriers prevented conducting interviews with some nurses I contacted. For

example, one nurse said that she had not been at the clinic long enough to comment on the use of videoconferencing there. Staff turnover is high in coastal clinics, and this was a significant barrier to collecting data. Missing one interview meant that an entire region of Labrador would be excluded from data collection, as the nurse who declined to be interviewed above was the only nurse at the clinic.

The challenge of conducting research on a small remote workforce merits further discussion. The small staff numbers were a barrier to collecting data in two ways. First, the high turnover of staff meant that a nurse had probably not been at a given clinic for a very long time, and second, the small staff of one or two meant that nurses had little or no support to relieve them while interviews were being conducted. Given the constraints of their work environment, they were very prepared to answer my questions and help me whenever possible. This research could not have been conducted without their help and flexibility.

Coding and Data Analysis

I coded all the data I collected, which allowed for continuity of context from collection to analysis. Mishler (1986) argues that transcribing interviews must be considered more than just a mundane task. He outlines the need to ensure that details of speech in the interview are outlined, giving the examples of pauses, overlaps and interruptions as important features of the interview that are often edited out in the transcription process. This advice was very helpful in preparing the interviews, especially regarding laughter that often occurred during the interviews. Mishler's (1986, p. 48) framing of an audio tape as "only a partial representation of what 'actually' occurred"

was crucial to convince me to go beyond my tape recorder to discuss the other elements of the interview that I thought were taking place.

I initially reviewed the interview transcripts with the goal of looking at each interview holistically to attempt to better understand the mutually constructed meaning of questions and answers. This helped me in "getting a sense of the whole database" of interviews that I had conducted (Cresswell, 1998, p. 143). As I read the transcripts, I often returned to the recorded interviews several times to ensure that there were no errors in the transcription, and that I was not imposing my own reality onto what really happened in the interview. Mishler (1986, p. 48) writes:

> First, investigators must keep in mind that speech is the intended object of study. At each stage of analysis and interpretation they must be wary or taking their own transcripts too seriously as the reality.

This reminder helped to keep from compartmentalizing the research process into stages of interview, transcription and analysis, and instead encouraged me to engage in a reflexive process that was tempered with frequent returns to audio tapes and notes collected at the time of the interview. However, despite this reflexivity, I spent the majority of my efforts analysing the text generated from transcribing the interviews. Cresswell (1998) encourages the researcher to immerse oneself in the details of the transcript, in order to garner a better understanding of the interview as a whole before it is broken into parts. In light of the work of Mishler (1986) and Cresswell (1998), I spent several hours poring over transcripts.

Following the initial reading and re-reading of transcripts, I began to code the data using QSR Nvivo software. As I had no previous experience using Nvivo, I relied heavily on three texts when coding the data. The first is the Nvivo manual, the second Richard's

(1999) text on using Nvivo for analysis, and the third Strauss and Corbin's (1998) *The Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. This software helped to organize the large data set.

Strauss and Corbin (1998, p. 101) define open coding as "the analytic process through which concepts are identified and their properties and dimensions are discovered in data." I began open coding the data set based on themes that were evident in the data, but also on themes that had been particularly resonant before transcription, such as staff turnover, training, and reliability of the network. I also made use of the coding categories available from previous ethnographic work at Vancouver General Hospital conducted by my colleagues on the same research project. I then used axial coding to link my categories to the central research question. This resulted in 79 open coding categories, of which several became central themes (see the next chapter).

While interviews were an effective means of collecting data about the challenges of telehealth from many levels of health care and community economic development, observing telehealth in action provided me with the opportunity to understand it from a situated micro perspective. The amount of observational data collected at the hospital in Goose Bay was very limited due to the short duration of the research trip to that area. Additionally, the limited use of videoconferencing for telehealth made finding things to observe difficult. Despite these limitations, the Goose Bay observation was very valuable in gaining a contextual understanding of videoconferencing for telehealth purposes from the practitioner perspective.

Policy Mapping: Understanding the Actor-Network

Following the Labrador section of the project, I relocated to St. John's where I began to map the actor network of Newfoundland and Labrador health information and technology policy. This work was conducted at Memorial University's library and relied heavily on the resources available at the Centre for Newfoundland Studies. The map was constructed based on results of library catalogue searches, Internet searches, and bibliographic data and information in the reports that I collected. It was then built using the Inspiration software program.

Actor-network theory (ANT) was used as a theoretical framework for mapping policy. ANT is a method of analysis that provides the examiner with tools for deconstructing a group of stakeholders (Mackenzie, 1999). This is accomplished by mapping the networks that exist between them and their interactions with other groups. Drawing on a design from previous health policy maps available via my research lab, I began to explore the connections between groups in order to better understand the current state of telehealth in Newfoundland and Labrador, and how the impetus for health informatics and distance mediating technologies in the health system was organized.

While ANT is useful for enhancing my understanding of connections between individuals, institutions and technology, its inability to address power relations within the actor network leaves it as only a stepping stone in a larger analysis. For example, knowing that no national policy was written in 30 years of telehealth use in the province demonstrates the need for policy, but does not address why this policy was left unwritten. This was supplemented by interviews with policy makers who added their contextual perspective.

ANT stipulates that there are no inherent differences between human and non-human actors; humans and nonhumans are considered equally important actors in a given network, removing the typical divisions between people, institutions and technology (Mackenzie, 1999). This was a useful construction when attempting to map out where these diverse groups intersected. In the case of telehealth micro actors are end-users and health professionals, meso actors are health administrators and technology managers, while macro actors are policy makers, government and industry.

ANT posits that micro and macro actors should be treated as though they are the same size, and any difference between actors is based on their ability to translate knowledge. Translation refers to the plethora of negotiation, violence, and other intervening factors that give certain actors agency (Boyne, 2001). This framing of actors is inherently problematic, as it does not account for differences in resources and capacity between groups (for example, the difference in the capacity of SmartLabrador to create telehealth policy in comparison to the Newfoundland and Labrador Centre for Health Information). Despite this major limitation, ANT does provide a meaningful system of tracking relationships between groups, and thus was a useful methodology for understanding the policy environment, as well as identifying interview subjects.

Limitations of the Research Design

Like all forms of empirical study, the research discussed here has several limitations. First, the research plan altered due to the lack of telehealth use in the Labrador region. I had intended to speak with health care workers about their experiences using videoconferencing for telehealth purposes, yet their lack of experience with the videoconferencing system being used for telehealth often made this difficult.

While this is an interesting finding of the fieldwork itself, as a first time ethnographer I found this challenging. Additionally, the lack of telehealth applications in Labrador made it difficult to observe more than a few hours of consultation, as the system was not being used as regularly as I had anticipated.

Telephone interviews conducted because of the remote nature of Labrador's coastal communities were also limiting. While nurses were generous with their time, they still faced competing demands for their attention, and a telephone call from an individual they had never met could not be expected to take up much time in a busy clinic with a small staff. This is understandable; in fact it is responsible on their part. Nevertheless, it limited the data I could gather from those interviews. Also, the interpersonal rapport of a telephone interview is limited in comparison with a face-to-face interview. Ideally, these interviews would have been conducted in person.

Finally, limited previous work in Newfoundland and Labrador policy mapping made it difficult to ascertain if my work was comprehensive. However, Elford's (1998) chronology of TETRA activities from 1975 to 1997 was an excellent tool for understanding the history of that organization, and how it was sustained over such a long period of time when other telehealth projects were not.

Conclusion

I have outlined the methods used to collect data surrounding telehealth use in Labrador. After describing my initiation into the field setting, I then discussed each of the methods used in this study, which was preceded by a brief account of the overarching framework of ethnography. My use of interviews, observation and policy mapping

enabled me to achieve triangulation of methods. In order to keep my work methodologically rigorous, I eliminated my planned survey of health care workers in Labrador as data would not be generalizable, and instead focused more heavily on interview data.

Data collection was a challenging and exciting process, and was guided by a theme of reflection about data that I garnered from Mishler's (1984) work. The combination of interviews and policy mapping yielded a large data set, to which I now turn.

Chapter Four:
The Contextual Barriers to Telehealth Use

This chapter provides analysis of the data collected during the summer of 2003. Several key themes emerged from the data, each reflecting a perspective of the research question: *What are the socio-technical barriers to telehealth use in Labrador?* Seven major categories emerged from the interview data. The themes that will be explored include 1. technology and spatialization with regards to health services, 2. technical problems, 3. fiscal constraints, 4. access to health care services, 5. organizational structures, 6. power and interorganizational trust, 7. labour issues, 8. work practice and context and 9. policy (including privacy, confidentiality and liability issues). Each of these will be discussed here under three broad headings outlined below.

Telehealth was expected to increase access to health care services, reduce transportation costs for patients, families and the health board, along with providing increased access to continuing medical education and specialist care. Expectations were outlined in the Labrador I.T. Initiative's submission to Industry Canada:

> In our health sector we expect the following results: Telehealth and networked diagnostic, consultative, patient record and training practices become a regular and operational reality in all of our health and related institutions such that greater numbers of our people have health information, receive care and medical interventions more quickly and at less cost, and the quality of health services is demonstrated to have improved. Medical practitioners, especially in our more geographically remote settlements, receive regular network-based continuing training and professional development such that they are able to provide a broader range of services locally and the quality of professional life improves

> whereby the high turn-over rate which presently exists is dramatically improved (Downer, 1999, p. 39).

Notably, the expectation that telehealth services would be used in many new ways was clear. However, what is lacking in the plan is a more detailed explanation of how these goals would actually be achieved, or any elaboration upon the implementation of these services at the micro level.

Considering that this has not come to pass, I address several constraints that prevented this from happening. I begin with a discussion of the crucial contextual theme: technology and spatialization. Under this rubric I explore the subtheme of technical problems. I then briefly discuss commodification, before moving on to structuration, a key theme upon which I elaborate in depth. In discussing structuration the following subthemes are addressed: 1. power and interorganizational trust, 2. work practice and work design and 3. policy. While commodification is an important element of the political economy of communication, the data collected demonstrates that spatialization and structuration are the main areas of concern in the Labrador telehealth context. The chapter then concludes by discussing the interplay of factors that limit technological uptake in the Labrador health context.

Technology and Spatialization

As a geographically remote region, Labrador has long dealt with issues of isolation and difficulties accessing health services. Relative to other areas in Canada, health care workers in Labrador have been required to use alternative forms of communication for decades. This need for innovation was demonstrated in an interview when a physician commented on the evolution of technologically mediated care:

> When I first came here there was no phone service to the coast. So in fact when we talked to the nurses on the coast we talked via shortwave radio...telephones came [in] about '84. It was early on [in my time here], but all the communications were via the radio (personal communication, physician, 10).

Spatialization, defined by Mosco (1996, p. 173) as "the process of overcoming the constraints of space and time in social life," was central to the perspectives of all people interviewed. The new infrastructure provided by SmartLabrador certainly marks a change in the options health workers have to communicate. One Smart Labrador staff member described her personal hopes for telehealth to bridge distances between remote communities:

> It is about a doctor here or a doctor in St. John's or a doctor in St. Anthony helping somebody in Makkovik with a kidney problem or a foot problem or a rash or whatever that might be...I have relatives on the coast and I know what's it's like to...have a Medivac and things like that. And I have a sister that has been sick all of her life so I understand, you know (personal communication, SmartLabrador staff, 12).

The need for enhanced access to health services was reiterated several times throughout interviews, and was an important issue for all stakeholder groups. An Innisian perspective sees this push for accessing health services from a distance as a process of moving from being bound by time to being bound by space. Health care providers see in telehealth the opportunity to overcome the spatial barriers that have been so characteristic of the Labrador experience. However, as the limited use of videoconferencing by Health Labrador for telehealth purposes shows, there is more to creating a telehealth program than simply providing a videoconferencing system, and more to overcoming time and space than providing infrastructure.

Infrastructure was not the only thing offered to the health care sector by the SmartLabrador project. As part of their "people first" approach, SmartLabrador offered training sessions in how to use the technology to anyone wanting to use it (SmartLabrador, 2000). The question of when and how health care workers should use telehealth was less easily addressed, and the lack of experience with videoconferencing technology was a factor in creating this problem. One nurse pointed out that while she had been trained to use videoconferencing, this training had been conducted by the telehealth coordinator over the videoconferencing system. She noted that she felt that she had not been adequately trained in using the technology (personal communication, nurse, 13). Having technology is one issue, knowing the most appropriate ways to use a given technology is another. This will be further explored in the discussion of work practice.

There was a general consensus from the interviews that the breakdown of the boundaries of time and space was a welcome change to the normal challenges in health care in Labrador. The vast majority of health care workers interviewed stated that they were happy to have increased communication with outside peers and physicians in a central location (personal communication, nurse, 9, nurse, 16, nurse, 17). This is not surprising given challenges they face as rural care providers. However, few of them used video conferencing for telehealth purposes on a regular basis, despite the hopes of SmartLabrador that offering this new technology would have a large impact on how work was organized in Labrador's health sector. This is not a new or odd phenomenon. As Grint and Woolgar (1997, p. 116) argue, "the assumption that technology will have a revolutionary impact on work organizations is far from novel." Expectations have not been met in telehealth, perhaps primarily due to the lack of understanding of patterns of

technology uptake, and also the need for technology, social practice and structure to work in concert. This also reinforces the continued dominance of time in Labrador's health services.

Despite the general consensus that more technology was a welcome addition to health care settings in the region, the positive view of increased technology in health outlined above was not universal. One physician poignantly stated that when assessing telehealth's capacity to improve health services, it was important to place it in context:

> We have telehealth...is that right amount of technology or is it too much technology?...at what point does the telehealth...actually undermine that confidence, so that nurses...or doctors on the Coast, depending, feel like there is always somebody who knows more than they do and if they can only connect into it they'll take over the problem...they rely on it and maybe by doing that their confidence is whittled away. It probably also is that their skills and abilities under difficult circumstances are whittled away too (personal communication, physician, 10).

While this critical perspective on technology was a marked change from the majority of 'tech fix' (Weinberg, 2003) responses, it represents a perspective that was not highly prevalent among interviewees. While most health care workers were supportive of the introduction of new technology (at least in the abstract sense), an overarching theme of making do with limited resources was voiced by nearly all those interviewed. One nurse commented on the need to "take work as it comes" and told me that health care workers approach their jobs in this way as they routinely work with very limited resources. As she put it, "You're in Labrador now, you just have to put up with it" (personal communication, nurse, 13).

Concern surrounding the displacement of expertise that some fear will arise from using telehealth was also commented on from the perspective of the province's telehealth veterans. An interview with a TETRA staff member was quick to point out that using

telehealth was not going to enable patients to "access the Mayo Clinic" simply because new distance-mediating technologies were available in their area (personal communication, TETRA staff, 14). Expectations of a more rapid response to health care questions may be possible, but it is clear that condensing space will not fundamentally change the type of services available, but simply make them more readily accessible. This differentiates the constraints of space and time from the financial constraints that dictate what can be accomplished in the health system.

Innis argues that high investments in spatially oriented technology come at the cost of vast changes in lived experience (Carey, 1989). One interviewee discusses this phenomenon, and outlines how telehealth may increase access to health services, but that it is a small improvement to dire situations in certain isolated communities where social problems are rampant (personal communication, nurse, 1). By resituating telehealth in Labrador's historical context, she vividly describes the irony of Weinberg's (2003) 'tech fix', and reminds us of the problems of overreliance on technological solutions. She sees the benefits of telehealth as marginal in comparison to the cost of the loss of temporally biased cultures in Labrador:

> I feel that [we're] coming to sort of a virtual life and I think it is not as satisfying. And I think that's evidenced by, you know, the family strife, the alcoholism, the inhaling addiction all over the Coast. It is pervasive, and [so is] the lack of self-mastery and competence in a lot of daily skills...we were talking how well we can do mental health assessments for suicides in Nain – well, there were 35 suicides in Nain in the past two years. [In the past] there weren't 25 suicides, you didn't need the technology to evaluate suicides 50 years ago because there weren't any. So big deal (personal communication, physician, 10).

This comment raises a key point about technological intervention. Will telehealth improve the health status of Labradorians? Perhaps gains will be made, but the large

addiction problems now pervasive in certain communities did not exist prior to the dominance of space in the region. Indeed, the Western[1] implementation of technology must take responsibility as one of several intervening factors that have helped create the current health status and social problems so prevalent in Labrador communities. While this historical context must be recognized, it is important not to simply lament a bygone era, but begin to problematize strategies for facing these issues.

Better access to healthy food and employment opportunities would surely be better goals, if admittedly more difficult to achieve. As Jennett and Andruchuk (2001, p. 172) argue, "telehealth in Canada should be driven by the needs of individual communities, regions and provinces, and less by what technology can do." However, as previously stated, this critical discourse was not the dominant perspective on technology. It is clear that in this context, telehealth is but one means of achieving better health. Telehealth must be undertaken in conjunction with holistic means of health services delivery, respectful of the Innu and Inuit people of Labrador. The move towards self-government and Innu-run counselling services in Shesishuit, along with progress made by the Labrador Inuit Association are examples of recent success in returning to a holistic definition of health, one that is grounded in the cultures of each group. Telehealth, as part of the traditional Western medical system in Labrador, can work in addition to these efforts.

Technical Problems

Although one may argue that the boundaries of physical space have been overcome in the Labrador context, is this really the case? Interviews revealed that while

[1] In this case, "Western" refers to the settler population.

videoconferencing technology enabled coastal health care workers greater access to the central hospital in Goose Bay, technical problems frequently prevented them from realizing potential benefits of telehealth. Coastal communities link into the SmartLabrador network via satellite, and the severe weather common on the Labrador Coast can render the system unusable.

This problem is compounded by the remoteness of many coastal clinics. SmartLabrador technicians cannot be based in every community, and clinic staff do not have the time to spend troubleshooting the system. One nurse noted that staff have spent large amounts of time attempting to restore a satellite connection:

> We're knocked out a lot. Weather is a big thing on the coast...and then...if there's some technical problems...the technician will call in and say, "Go up to where the main box is and press this button and do this and do that and do something else," and I've had my staff up top five and six hours working on it, but they're not technicians, so they can only do what a technician is telling them and then often times they have to come in and you know, play with the boxes...[during that] time they could be doing something else. We work with a very small staff, its myself, a personal care attendant and a maintenance man. So there's three of us, you know (laughs), we don't have time (personal communication, nurse, 9).

While this maintenance was done in cooperation with a SmartLabrador technician, it is clearly an unsustainable practice given the heavy workload in coastal clinics. Using SmartLabrador and Health Labrador staff to deal with technical glitches is problematic for both groups.

Health Labrador had limited experience in using videoconferencing for telehealth with the Remote Community Services Telecentre (RCST) research and development project, which was a pilot study of videoconferencing based in Forteau (on the Labrador Straits), Goose Bay (in Central Labrador) and Nain (on the North Coast of Labrador) (Downer, 1999). While this project provided Labrador with the initial opportunity to

engage with videoconferencing for telehealth purposes, one health administrator was quick to point out that there had been little, if any evaluation of the RCST project, and was not certain that videoconferencing was the most appropriate technology for use in the Labrador health context (personal communication, nurse, 6). Again, this reflects on the need for longer term projects with more emphasis on user-centric methods of evaluation.

The technical issues in the system were not limited to coastal areas. I witnessed these problems when I sat in on a continuing medical education rounds in Goose Bay. Being the site where the majority of Health Labrador staff are located, and where most of its physicians are based, it is the most important site for connecting with the rest of the region, and with outside sites such as St. John's, where the provincial medical school is based. The telehealth coordinator had difficulty when connecting to a continuing medical education videoconference in St. John's. When I questioned a physician present about the problems connecting, she stated that it was a common problem, and one that undermined their confidence in the technology. The general consensus between those waiting for the videoconference to begin was that their schedules did not allow for 25 minutes of time to be wasted on a system that was not always reliable. However, when interviewed later, the attitude towards the technology softened, and each of the physicians interviewed seemed prepared to continue to use the system when possible and appropriate (personal communication, physician, 10, physician, 11). Nonetheless, this raises the issue of the continued non-use of the videoconferencing system.

Interestingly, despite the large fiscal investment in new technology, the majority of health care workers interviewed cited the telephone as their primary means of distance mediating communication. One nursing veteran told me that the most significant

technological change in the past five years had been the introduction of the speakerphone, as it allowed nurses to perform their work hands-free (personal communication, nurse, 6). It seems that work practices are not changing as anticipated, and the geographic barriers typical of the Labrador experience have not been completely eradicated. Indeed, the telephone is still the most common mode of communication between Goose Bay and the Coast.

Commodification

The era of fiscal restraints in health care was a repeated theme that emerged from the data. Using a political economy approach, telehealth can be viewed as introducing another commodity for the purpose of exchange into the health system. Commodification refers to the process by which something is given market value; how it becomes a product to be bought and sold. Using a Marxian perspective Mosco (1996, p. 141) explains that, "commodities ensue from a wide range of needs, both physical and cultural."

The differentiation between use and exchange value in rural health care was demonstrated in the data. Use value refers to the value an entity has in satisfying a human need, whereas exchange value refers to what something can extract in a market (Mosco, 1996). In this case use value is the need for access to health services, whether that be a Mental Health Assessment or a check-up following a face-to-face interaction with a physician. One interview outlined the capacity of using telehealth to improve access to care. He described the current problems in accessing mental health assessments following a threat of suicide:

> They'd [patients] probably be kept in an RCMP prison, until a plane could fly out [to the central hospital in Goose Bay]...and then they end up getting thrown in jail sometimes if the weather could come down, about three or four or five days, 'til they get out. So the benefit of the [videoconferencing] system is that you can stop that, because they don't need to be [in police custody]...but there are no safe places in these communities other than the prison. You wouldn't have that if you were in Toronto waiting for someone to be assessed. It wouldn't be, you'd have other locations [to undergo an assessment] (personal communication, physician, 11).

Telehealth's use value involves collapsing space to enable patients to be seen by a physician without having to endure imprisonment, a feature valued by the physician in question, and surely by the patient waiting for an assessment. Notwithstanding these benefits, it must be recognized that the physician thought this process useful only when weather prevented a Medivac team from flying the patient out of the community. In general, he preferred a tactile, face-to-face patient interaction.

Mosco (1996) argues that the use value of a service such as telehealth is not limited simply to basic needs like health, but is also socially constituted. For example, the idea of increased access to health services via videoconferencing may seem unnecessary in an urban context, where a complete medical staff is available within a reasonable proximity. However, in an isolated remote community the added security of knowing a service is available may impact the choice of a parent to remain in a community. As one SmartLabrador staff member noted:

> It encourages people to stay in the small communities because as a parent, for instance, I would be very, very reluctant to move to a small community without medical facilities. Especially in northern Labrador, where in the middle of winter, or in wintertime, you've got very serious winter conditions. (personal communication, SmartLabrador staff, 3).

This use value is closely interconnected with one of the five principles of the Canada Health Act, access to health services.

In contrast to the personal value associated with use, exchange value refers explicitly to the "value that a product can extract in exchange" (Mosco, 1996, p. 141). Products that are principally organized through the process of exchange are commodities, while commodification involves the changing of use values to exchange values. Through the process of commodification telehealth moves from being conceptualised as a source of increased access to care to a means of fiscal rationalization, complete with a cost for using the videoconferencing system of $75 per hour. From this perspective, telehealth is simply a means of decreasing the cost of providing health services, a major concern for Health Labrador (personal communication, nurse, 6), and arguably the most pressing concern regarding health care in Canada today. Mosco (p. 143-44) states:

> commodification refers to the process of turning use values into exchange values, of transforming products whose value is determined by their ability to meet individual and social needs into products whose value is set by what they can bring in the marketplace.

Use of telehealth services, specifically the videoconferencing network created by SmartLabrador, was available to anyone who wished to use the network free of charge until October 2003, at which point the use of videoconferencing became available via a fee for service model. Interviews with Health Labrador administrators revealed their concern that telehealth might create an increased cost to the health system, without offering an immediate reduction in costs for a given health service. For example, Health Labrador has negotiated a contract with a local airline to provide service to and from a northern community to the central hospital in Goose Bay. As one administrator explained,

> on the North Coast currently...we have a contract with an aircraft service carrier provider whereby for the hours that we fly, bringing patients to and fro, we offer an airline service, basically...But...even though videoconferencing may be cutting back on the numbers of people required to travel, it is not cutting back on the cost of travel, because there hasn't been a sufficient decrease in the numbers for it to mean anything to us in that we are still required to make the same number of trips. (personal communication, health administrator, 8).

Just as an airline must pay for a plane that has many empty seats, Health Labrador must ensure that a trip is made to the North Coast even if only a few patients need to come to Goose Bay. This means telehealth, in this context, does not offer the health board any real savings. Health administrators clearly anticipated an immediate cost savings when using telehealth, which they did not see in the short term. Given the financial constraints facing the organization, it is not surprising that their enthusiasm for pursuing telehealth has diminished. Using videoconferencing does not currently offer them a means of saving money for a large amount of their population, and using it for only the areas where Health Labrador pays for the patient's plane ticket individually will create differing levels of access within their service area. Arguably these differences already exist between Labrador communities, but it seems impractical from an administrative perspective to introduce a new service to only part of the region they serve.

The conceptualisation of telehealth as both having a use and an exchange value illustrates the dialectic that exists between improved health services and fiscal restraint. This dialectic coloured the case study, and emerged from several interviews. Telehealth is seen as having a different type of use value and exchange value by Smart Labrador workers, who see telehealth as a means of improving the quality and accessibility of health services in the region, as well as a means of generating revenue to enable a sustainable broadband network in Labrador.

Structuration

The Labrador Information Technology Initiative was vested with agency by the Canadian state through Industry Canada's *Connecting Canadians* agenda to technologize the region. The group also used its interpersonal connections and strong record of community work to build alliances throughout the region. However, their goals of increased usage of videoconferencing for telehealth purposes did not match precisely with the goals of the region's main health board, Health Labrador. As the data will show, working between institutional structures (community development and health care) is not as simple as each group may have first conceived it to be.

The perspectives on what telehealth should be differed drastically depending on the stakeholder. While health care administrators were principally concerned with the cost of telehealth to the health board, SmartLabrador workers see telehealth as primarily a capacity building tool for increasing access to health care services and building Labrador's technological skill base. The competing priorities of the two groups were present throughout the interviews, and serve as an example of structuration's key role in the success or failure of telehealth implementation. The goal of the SmartLabrador project was to integrate telehealth, at least partially, into the regular health services in Labrador during its three year demonstration project. Health Labrador, while still planning to use videoconferencing for telehealth purposes, has a competing set of priorities, including austerity, staff turnover and workload management. These structures constrained the activities of the health board in relation to SmartLabrador. In turn, the limitations Health Labrador encountered when using telehealth did not serve the interests of SmartLabrador. The Smart Labrador project envisioned telehealth as a key element of their business plan, and hoped to establish telehealth as one of their major Smart Services

(personal communication, SmartLabrador staff, 3). This involved installing equipment in each of Health Labrador's clinics. In addition to being a key part of the business plan, the staff of SmartLabrador, all of whom were hired locally to work on the project, regard telehealth as also part of what I term their "rural sustainability strategy." As citizens of the area, their first hand comprehension of the confines of geographic space makes them exceptionally sensitive to the need for improved access to health care services. These concerns are exemplified by this SmartLabrador manager:

> There is a major problem with staffing a lot of the clinics...and the sad thing is that you still got people in those communities, you still got accidents happening and you still need medical treatment (personal communication, SmartLabrador staff, 3).

As this interview demonstrates, using telehealth successfully is not simply a matter of adding technology to a typical health care environment. The lack of readily accessible medical services is clearly an outstanding issue in the Labrador context.

Technology and Work: Power and Interorganizational Trust

Several institutional structures are involved in the unrolling of telehealth in Labrador. Labour issues are a key area of concern, which play out in oppositional ways. As will be shown, these issues have had both catalytic and deterring impacts on using telehealth services. Currently the Association of Registered Nurses of Newfoundland and Labrador (ARNN) is encouraging its members to adhere more closely to the clinical guidelines regarding which procedures nurses actually should perform (personal communication, physician, 10). This clear definition of what constitutes nursing work acts as a catalyst for telehealth by encouraging nurses to use videoconferencing to connect physician to patient (in addition to the nurse's consultation).

However, issues associated with collective agreements can also make using telehealth more complicated. While union pressure was cited as a means of increasing telehealth use for medical procedures, the opposite was true with respect to actually installing and maintaining the videoconferencing team stations in coastal clinics. The shipping season in Labrador is extremely short, ending in November of each year. This meant that when the Labrador I.T. Initiative was awarded the SmartLabrador project they had to work at lightning tempo to ensure that the physical infrastructure would arrive in Labrador before the season ended. It also meant that all supplies necessary to install Internet connections, along with the computer hardware itself, had to be in place as quickly as possible. This resulted in long working hours for the non-unionised SmartLabrador staff installing the network. One interview painted a picture of the rapid pace at which the project began:

> [The SmartLabrador project contract with Industry Canada] was signed... [in] March, and then we had to hire, we had to get the technicians in place we had to get field workers in place we had to get contacts in the communities, we had to get employees. And we had to have everything purchased and ready to go to 44 sites in a matter of 6 months. And we had equipment coming from the United States, and we had equipment coming from all over Canada (personal communication, SmartLabrador staff, 3).

In order to have the equipment in place in time for the harsh Labrador winter, SmartLabrador's technical staff planned to work late into the night installing the network. While the only workable solution for SmartLabrador given the strict three year project timeline of the Smart Communities program, this pace of work was not suited to a health care environment. Given that health records are kept at the clinic where this equipment is being installed, Health Labrador was unable to allow SmartLabrador access to any clinic without a Health Labrador employee present. This ensured that standards of patient

confidentiality were maintained (personal communication, nurse, 6). This also meant that overtime hours would have to be paid to Health Labrador employees for the extra time they spent in the clinic, which in turn impacts the budget of the health board. In this context, there are different rules governing different organizations, and the union/non-union work environments came into conflict.

One health manager also stated that Health Labrador's collective agreements limited their ability to have SmartLabrador employees doing extensive work in the clinics (personal communication, nurse, 6). SmartLabrador, as a non-unionised employer with the goal of completing its network as quickly as possible, was in conflict with the collective agreements that bind Health Labrador's actions. Union issues clearly came into play in the inception and the construction of the SmartLabrador network, and influenced how telehealth was initially perceived.

The question of power must be addressed in this context. While all parties were committed to creating a network that increased Labrador's technological capacity, the challenges of working between groups and between organizations proved significant. As one SmartLabrador worker explained,

> It definitely became a control issue...we weren't allowed in the clinics, we couldn't do this, we couldn't do that. But if we wanted to do training, to train the nurses or something like that, I wasn't allowed to do it at all here (personal communication, SmartLabrador staff, 12).

Indeed, it was also clear from interviews that Health Labrador also felt a struggle over what was happening regarding telehealth. One administrator elaborated on the problems of communication between the two groups:

> I think it's been almost like two silos...We're working along side each other...I wasn't always aware of what there were doing, so it was very

> difficult to either support it or to know what was going on...this ranges from very small technical issues to quite large issues (personal communication, nurse, 6).

These issues of trust and mutual understanding were among the biggest challenges to implementing videoconferencing as a new telehealth service. Given the short term nature of the project, it is difficult to predict whether problems such as these can be resolved in the long term. Future research into the long term outcomes of the SmartLabrador project could potentially map the evolution (if any) of the social relationships between the two organizations.

It must be made clear, however, that the expressions of conflict were generally not expressed from a staff level, but generally from management. Exactly why this differing perspective emerged may be related to the policy questions that each organization would like addressed. Had it not been for initial privacy concerns (outlined later in this chapter), it is possible that a great deal of the conflict between the organizations could have been avoided.

Work Practice and Context

The structure of work surrounding telehealth demonstrates a lack of sustainability regarding staff involved in telehealth. For example, the telehealth coordinator at Health Labrador is hired for a 12 month term whose future employment depends on renewed grant funding for the position each year. While the skills and interpersonal network for functional telehealth services requires a long term commitment (Noorani & Picot, 2001), the telehealth coordinator position was filled by six different people between 2001 and 2003. Without the funding to enable stable employment, retaining a single staff member proved difficult.

The telehealth coordinator's ability to exercise agency is limited by the time spent in the position, and by the lack of permanence in the job structure. Additionally, the work processes for the telehealth coordinator were not always clearly defined, a phenomenon reflected in the literature. As Noorani and Picot (2001, p. 28) state, "much is expected of the telehealth site coordinator but there are no performance standards relative to the special skills and knowledge needed in the practice of any telespecialty." This relates not only to a specific telehealth coordinator but also to individual staff members who may be expected to use telehealth on a regular basis despite there being a lack of training in procedures for using the technology.

It is clear health care workers in Labrador have long been expected to use one distance mediating technology or another (personal communication, physician, 10). However, the introduction of videoconferencing marks a change in how their work is constructed. The issues of increased workload, change in work practice, work arounds and time management were all raised as problems associated with using videoconferencing for telehealth purposes.

There is an extremely high turnover in health care staff in Labrador (personal communication, SmartLabrador staff, 2, SmartLabrador staff, 3, physician, 11, physician, 12, nurse, 13, TETRA staff, 14). Many people interviewed from the health care and technology perspectives alike saw implementing telehealth as a challenge given that many physicians remain in the region for under two years. They noted how it was difficult to build a long term vision with a high level of expertise in an area when people were only making short term working commitments.

With a high level of staff turnover and a perpetual shortage of trained medical staff comes an increased workload for those employed in the Labrador health context. Several nurses, physicians and administrators explained how the heavy workload makes it difficult to introduce new tasks into the workday:

> One of our greatest problems right now is people can't get appointments in the facility because there aren't any appointments available. There are salaried physicians who have a myriad number of responsibilities...to add another responsibility to that portfolio, can almost break...the camel's back (personal communication, nurse, 6).

The coastal communities' regional nurses work a rotating call shift each evening. Described by one coastal nurse as "24/7 work," individuals working in communities where there is only one regional nurse are on call at all times (personal communication, nurse, 1). Integrating telehealth in a way that limits the amount of additional tasks an individual must perform is vitally important. How this can be accomplished remains to be seen, although the integration of videoconference consultations into the clinical practices of physicians would be one means of alleviating this problem. High workloads dictate that telehealth become a means of reducing health care providers' workload, and so it is important that a seamless means of using telehealth be designed with the user context in mind (Bush, 1983). This could be accomplished if a long term telehealth program were developed; however, the current haphazard videoconferencing use at Health Labrador makes the likelihood of this happening very limited.

The workplace context is an important factor in deciding when and how a technology should be used (Bush, 1983). Several nurses and physicians explained that although they saw videoconferencing as a means of enhancing communication between communities and enabling quicker access to medical services, it was hard for them to use

the system. Currently videoconference consultations such as mental health assessments are conducted during the emergency physician's shift, meaning that the workload for that shift has increased. The interaction between the variable nature of health care and the rigidity of the videoconferencing system acts as another constraint to using the technology. The bandwidth required for videoconferencing must be booked in advance, whereas the number of patients in the emergency department at a given time is highly variable. A potential solution to this problem is the integration of video consultations into the clinical practice of physicians, whose family practice offices are located within the hospital. As one physician noted:

> Often when I start an emerge shift I'll be told that at 11:00 they'll have set up a teleconference. Now like I said, that's going to be problematic. If it were in the clinic you'd be fine, whereas in emerge you could be up and going and a heart attack will walk in through the door (personal communication, physician, 11).

Clearly, the organization of work plays a key role in the usability of this telehealth technology. The utopian visions of telehealth outlined in many federal and provincial reports are not being realized, and the expensive system now in place is not being used to nearly its intended capacity.

The isolation of the communities that the videoconferencing system was built to serve also poses a significant barrier to using telehealth, or, in fact, the system at all. Labrador experiences extreme winter weather conditions including very high winds. The SmartLabrador network is a combination of different technologies (fibre, frame-relay and satellite), with satellite being used for remote communities. The frequent high winds can physically shift the satellite on the local clinic, making the videoconferencing team stations non-functional. This has resulted in staff members spending long periods of time,

sometimes up to five or six hours, attempting to restore the satellite dish to its original position (personal communication, nurse, 9). While this might not be an issue in a larger facility, dedicating this many staff hours to such a project when busy clinics have a three person workforce is difficult to justify. While nurses stated that they were happy with the efforts of technicians, the amount of time involved in keeping the system operational was too demanding to maintain in the long term:

> We [have] had telehealth... for...probably 2 years, and the system is up and running but we're not using it to its maximum capacity. We do have mechanical problems from time to time...the system is often down, very often down, and we have technicians, almost constantly working on that to make the system more adaptable to the weather, really. Because the big dish outside can often times get moved and the system can go down, and because of that I don't find it 100% reliable. You can say, well, tomorrow I'm going to have telemedicine, you know, or I'm going to do a conference call with a doctor. But in the morning that system could be knocked out. So that causes a lot of problems, because there is no point in setting up some time if you know that it may be down. We haven't used it to any great lengths for nurse/doctor consultations, because, again, we are often understaffed, and our doctors are worked to the limit and often times the time just won't correlate for you to go on (personal communication, nurse, 9).

Indeed, there is certainly a barrier created by the inadaptability of the technology to Labrador's extreme weather patterns. While technology purports to have conquered space, that notion is challenged in this rural environment, reinforcing the continued temporal bias in the Labrador context. In this environment, geographic space is still dominant.

I do not wish to prematurely conclude that telehealth cannot be successfully implemented in the Labrador context. A recent study (Jong, Horwood, Robbins & Elford, 2001) demonstrates the fiscal effectiveness of a store and forward imaging system for Labrador telehealth use. Store and forward technology will digitally transmit images to a

computer at a central hospital, and does not require physician and patient to meet in real time. It is important to note that the study "does not take into account the dynamics of the nurse-patient-physician relationships and their impact on the utilization of and response to the telemedicine system" (p. 16). This study was also conducted with the strong personal commitment of a physician in the area, which seems to be a crucial factor in the sustainability of any telehealth application. Currently, the physician is not working in the area and the system is not being used. Issues such as availability of a physician to view the images, along with a lack of training for nurses and physicians were identified as barriers to continued use of store and forward technology for telehealth purposes (personal communication, nurse, 1). This underlines the need to understand how technology is used in the everyday.

Additionally, cost savings achieved by using videoconferencing cannot be universally applied throughout Labrador. Health Labrador arranges for patient transportation to the region of Labrador studied by paying for each patient's travel individually (personal communication, nurse, 9). In other words, the health board experienced a direct cost savings each time the store and forward software was used instead of transporting a patient out of the community. This is different from the context of Nain on the North Coast, where a charter service transports patients to and fro, and it would take a large number of telehealth consultations to actually make a difference in the amount of fiscal investment made in this area. As has been demonstrated, telehealth technology needs to be evaluated beyond the typical pilot project cycle of implementation. This, in turn, presents the challenge to administrators of choosing to

continue to pay for an expensive telehealth program without long term understanding of the benefits of the system.

Policy

Strong momentum for technologically mediated care has been reflected in federal policy documents and funding initiatives. Despite this enthusiasm, a major gap exists between reported plans for telehealth and actual policy and policy-making bodies needed to create a telehealth system. Indeed, despite the utopian visions of telehealth in government policy documents, its contextual use has not been fully explored from a policy perspective. As Noorani and Picot (2001, p. 27) argue, "the policy and medico-legal literature would suggest that telehealth creates more problems than it solves," referring to the challenge of protecting patient confidentiality. Given the provincial administration of health care in Canada, the question of health policy must be situated within the provincial context. However, finding provincial policy with respect to telehealth proved difficult: it currently does not exist (personal communication, TETRA staff, 14, policy advisor, 15).

Several federal policy bodies address telehealth, beginning with the Information Highway Advisory Council (IHAC) in 1995. However, the discussion of health services in IHAC was limited to a sort of "catch-all" justification of fiscal investments in technological infrastructure, as was discussed earlier in relation to the myth of technological dependence. The final report of the Advisory Council on Health Infostructure (ACHI) in 1999 resulted in the establishment of the Office of Health and the Information Highway (OHIH) later that year. OHIH is "Health Canada's focal point for the use of information and communication technologies (ICTs) in the health sector"

(Health Telematics Unit, 2003, p. 16), and is responsible for developing federal telehealth policy, although this responsibility has been delegated to several bodies in the past. Central areas of policy development identified by OHIH include: integrated provider solutions, protection of personal health information, issues of licensure and reimbursement, and change management (Health Telematics Unit).

Privacy, Confidentiality and Liability

Telehealth marks a point where time/space compressing technologies interact with public policy. Health care workers are concerned about protecting the privacy of health information and maintaining confidentiality standards in all dealings with patients. As videoconferencing is a new technological interface in the Labrador community, systems for its use are not yet well defined. This lack of developed protocols for using telehealth systems (e.g. ensuring cameras always had a lens cap on them when not in use) left room for problems to develop. One incident involving a potential breach of confidentiality has served as a major deterrent to using telehealth for Health Labrador, and has undermined the relationship between Health Labrador and SmartLabrador (personal communication, TETRA staff, 14):

> We had some bad experiences from the start, and I don't know if you're aware of this...but we had, for example, we had cameras set up in clinics where individuals had access to real time images of clinics and what was happening in clinics, without our knowledge...so that caused us some concern. And I know we dealt with that through SmartLabrador people, but all of that led to some mistrust if you want, in the system (personal communication, health administrator, 8).

Since this time, SmartLabrador has developed protocols based on those used by TETRA. However, it must be clarified that the fault for this error cannot be simply attributed to SmartLabrador. The Smart Communities project timeline is a strict one, and telehealth is

only one of the Smart Services that the community development project was attempting to implement. With no prior experience in telehealth, and no provincial telehealth policy in place, it is not surprising that concerns regarding patient privacy entered the fray. Jennett and Adruchuk (2001) argue that concerns over privacy, security and liability are ongoing concerns in telehealth projects nationally.

Evidently, the lack of protocols surrounding telehealth applications remains a large concern for health care administrators, yet they do not have the tools to adequately develop these procedures at the health board level. Indeed, addressing privacy concerns requires research and policy. The Newfoundland and Labrador Centre for Health Information (NLCHI) has been working to address questions of privacy in their work surrounding the electronic health record (EHR), which they have been building as a three pronged process. While it is impossible to translate the research conducted in preparation for a functional EHR directly into guidelines for telehealth privacy, important lessons can be learned from the NLCHI's work when planning telehealth privacy policy. For example, the 1999 NLCHI report *Privacy, Confidentiality and Access Standards* outlines 11 privacy standards regarding the implementation of the EHR. While all research on the EHR cannot be transferred to telehealth, some background information can be garnered from the NLCHI's work in this area. Until privacy is addressed at the provincial policy level, the same constraints faced by Health Labrador will likely apply to other health boards.

Liability was also identified as a problem for several physicians and health administrators. A lack of clearly defined boundaries exists for practitioners regarding the repercussions of giving medical advice over a videoconferencing network. This was

raised as an issue for mental health assessments, as it is difficult to make a subjective judgement of an individual's condition without being able to see the patient face-to-face. One physician commented on feelings of wariness when using videoconferencing for physician-patient contact:

> I think the thing we use it [videoconferencing] most for with the patient is the mental health assessment. Specifically from Nain, but also from other communities, and they seem comfortable enough, but I question a little bit how accurately I can assess someone's mental status through a camera lens and I also question what my legal responsibility would be if someone went out and injured themselves or harmed themselves and I had cleared them without actually seeing them (personal communication, physician, 11).

The issue of liability was also raised from the nursing perspective. Despite efforts to enable distance care, a regional nurse (essentially working in the capacity of a nurse practitioner) is not obligated to perform a procedure if she is not comfortable with it. While videoconferencing may be used as a means of increasing contact between nurses and physicians, pressure to increase distance supervision of procedures may be met with resistance from the Association of Registered Nurses of Newfoundland (ARNN), as a nurse could be held liable for the outcome of a given intervention (personal communication, nurse, 6). When I discussed this issue with health administrators, they addressed their own concern for a lack of experience and direction in dealing with liability issues in distance-mediated care:

> Even with the forwarding of the [patient] images, we have names associated with images, and where these images going, who has access to them, and all of that has to be worked out in terms of...a specific industry standard for heath care which assures total confidentiality. And so we've got to sort of balance that against what is the procedure (personal communication, health administrator, 8).

Again, this reflects the need for provincial leadership in creating flexible and contextual telehealth policy. Provincial policy could draw upon the expertise of the NLCHI and TETRA, using dedicated funding to expand current governmental capacities in dealing with critical issues in health and ICTs.

The impacts of the fragmented federal telehealth policy development were seen throughout the case study. The lack of guidelines to follow regarding *how* telehealth should work emerged as a problem for all groups interviewed. With interviews ongoing, I began mapping Newfoundland and Labrador telehealth policy as a means of determining where the provincial government's Department of Health and Community Services situated telehealth. While telehealth has been used in the province for three decades, no province-wide policies have been written regarding telehealth. As a recent environmental scan reveals, "major barriers to widespread use of telehealth and/or the evolution of telehealth into the existing health care systems continue to be policy and regulatory barriers" (NIFTE 2003, p. 5).

Regardless of this constraint, TETRA has been the province's leader in establishing telehealth services, and although they have no mandate to write provincial policy, they have provided guidance for health boards and other organizations when using videoconferencing for telehealth. Their expertise runs the gamut of direct care provider/patient relationships, continuing medical education, and administrative meetings. Currently, the National Initiative for Telehealth (NIFTE), a "multi-stakeholder interdisciplinary project that is developing a framework of national guidelines for telehealth" (NIFTE 2004, online) provides guidance regarding telehealth applications. However, despite the interdisciplinary team involved in NIFTE, the group does not exist

as part of a provincial ministry of health, and thus still does not address the provincial policy gap in Newfoundland and Labrador.

The lack of telehealth policy seems almost indicative of the history of telehealth in the province. Telehealth in Newfoundland and Labrador has typically had limited government involvement and very small amounts of provincial funds. Telehealth was championed by Max House, a Newfoundland physician who saw the need for distance health care services from his work as a neurologist. He worked to create both pipe (by arranging for designated phone lines to be built across the province for audioconferencing) and content (by obtaining grant monies to conduct pilot projects over the audioconferencing system), developing a piecemeal telehealth program which resulted in the creation of the Telemedicine Centre at Memorial University's Faculty of Medicine (personal communication, TETRA staff, 14). A year later, in 1988, the Telemedicine Centre and Memorial's Educational Technology Group combined to form TETRA (Elford, 1998).

TETRA works on a cost recovery model, where its operation depends on being able to use service fees to pay for its audioconferencing and videoconferencing networks. This allowed TETRA to survive when many other telehealth projects did not last beyond pilot project funding. It does not receive funding from the provincial government, nor does it have the mandate or authority to create telehealth policy on a provincial level. However, the provincial Ministry of Health and Community Services looks to TETRA for expertise in telehealth (personal communication, TETRA staff, 14). When questioning a Newfoundland health policy expert about the lack of telehealth policy in Newfoundland and Labrador, she described a long list of competing priorities, and a

small budget with which to handle them. She noted that fiscal restraint meant that prioritising in policy making was essential, and that telehealth was simply a priority further down the list. A policy gap such as this makes investment in telehealth of questionable benefit.

Despite this lack of policy, there are new prospects on the telehealth horizon in Newfoundland and Labrador. In 2000, the federal government announced its plan to invest $500 million in the creation and funding of an independent corporation to act as a catalyst for the integration of ICTs into health care. This resulted in the creation of *Canada Infoway Incorporated* in 2002. *Canada Infoway Inc.* was awarded an additional $600 million in 2003 (Canada, 2003c) and is currently engaged in discussions with TETRA and the provincial Ministry of Health and Community Services regarding the formulation of telehealth policy for Newfoundland and Labrador (personal communication, Telehealth Working Group Meeting, 20). While it is unclear what will emerge from this process, telehealth policy stakeholders in the province are hopeful that this will enable telehealth to grow as a policy-based health service.

Conclusion

This chapter has outlined the results of research conducted at several sites throughout Labrador and the provincial capital of St. John's. While the results were broad, for the purpose of this work I attempted to narrow them to several key themes that emerged and re-emerged from the data. These were framed by the central phenomena of spatialization and structuration.

I began by exploring the impact of spatialization on health services, and outlined how technical problems counteracted the space binding properties of videoconferencing

technology. I then explored how the use and exchange values for telehealth differ, and how Health Labrador's fiscal constraints limit its capacity and willingness to engage with telehealth as a new means of service delivery.

I then explored my main theme of structuration, examining the rules and resources in the Labrador telehealth environment. These include the incompatibility of the short term *Connecting Canadians* agenda with the long term health care agenda, the issues of power and interorganizational trust that emerged through interviews, and the question of non-unionized employees working in a unionized environment.

Following this discussion, I turned to work practice, where I examined the short term employment available as telehealth coordinator, the high level of staff turnover and high staff workload, along with the problems in work design. These factors work together to make it imperative for telehealth to work seamlessly, though how one creates a seamless program remains unclear. Finally, I discussed the lack of provincial telehealth policy from a historical perspective and link this to questions of privacy, confidentiality and liability. The concerns of health care workers and administrators clearly can only be addressed through a strong provincial commitment to writing policy for telehealth applications.

While initially the SmartLabrador project expected a high level of uptake of telehealth services, this has not been the case throughout the demonstration project. The socio-technical context explains a great deal of why this level of uptake has not been generated, but also uncovers deeper questions around technology, policy and health care. Has the responsibility for policy been offloaded from the province to health boards and

even community groups? These organizations clearly do not have the budget nor the mandate to write policy.

Questions around access to basic health services also remain. High workload for salaried physicians, chronic shortage of staff and high levels of staff turnover all point to the larger problem of service provision in rural and remote health care. While telehealth was intended to be one means of mitigating this problem, discrepancies between urban and rural access to health services need to be addressed. Few would argue that accessing services in a rural area should be as simple as it is in an urban context, but steps should still be taken to reduce the gap between these landscapes.

Chapter Five:
Conclusion

It is clear that the socio-technical determinants of telehealth use are many and varied. This thesis has attempted to shed light on several of these issues via an in depth case study of the Labrador region's use of videoconferencing technology for telehealth purposes. This chapter will review key elements of the thesis, provide a discussion of the limitations of the research and propose potential research that builds on the case study undertaken in this thesis.

Review of Thesis

I began with an introduction of the field of telehealth, and situated the reader in the Canadian telehealth environment. This environment is filled with short term projects, and analysis of this revealed a "perpetual pilot project" cycle in terms of telehealth use and development in Canada. Many projects do not last beyond this first phase, making it difficult to understand and evaluate the impact telehealth has on health service delivery.

In Chapter Two I framed telehealth from a communication perspective by discussing it in light of Innis' concepts of space and time, Babe's technological myths, and Mosco's political economy of communication. Innis argues that favouring spatially bounded technologies over time bounded technologies emphasizes placelessness and a change in the lived experience in community. My analysis supports Innis' thesis to a degree. While technology has played a large role in changing lived experience in Labrador, it has not completely overcome the bounds of geographic space in the region.

Innis' concepts of space and time illustrate how the face of health care in Labrador is expected to change based on access to new technologies. No longer are isolated communities solely dependent on telephone and Medivacs to ensure adequate access to health services. Indeed, this new technology marks a real change in how health care may operate. But this is just one piece of the complex telehealth question. We must ask, if this technology is not reliable, and the barriers to using it are so many, is space really dominant?

While the Innis thesis holds a great deal of weight, in reality the barriers of geography have not been entirely overcome through use of this technology. Place still counts, and socio-technical issues, including those associated with structuration, work practice and public policy are important elements of the telehealth puzzle. Technology must not be used as a substitute for human resources, and maintaining a balance between state of the art technology (videoconferencing) and functional technology (the telephone) should be the ultimate goal of using technology to enhance access to care in rural and remote areas.

Structuration is perhaps the most important phenomenon in this case study. Structures dictate to a certain extent what happens in social life, although agents can act in ways which change or evolve structures. A structuration perspective demonstrated how the fiscally restrained health system, an integral part of the Canadian state, acted as a structure that influenced the ability of a health care board to engage with telehealth. As interviews progressed, it became increasingly clear that the structures within which the organizations exist played a dominant role in determining what could and could not happen in terms of telehealth. SmartLabrador's pilot project structure also dictated to a

certain extent the terms by which the two organizations engage. The timeline was short, and the resources were limited. Just as understanding the macro constraints of the organizations illuminated broader limitations, examining telehealth from a structuration perspective also revealed the challenges that both health care provider and technology worker face when attempting to integrate telehealth into work practice. While expectations for telehealth are envisioned in an ideal health services environment, there is a very different health services environment in practice. The structure of a multi-organizational telehealth system in an era of fiscal austerity and very limited public policy makes it difficult for local health care workers to integrate telehealth into day-to-day practice. As Suchman (1987) articulates, the difference between plans and situated actions regarding technological implementation must be explored through ethnographic field studies in order to understand the contextual limitations under which a group operates and a technology is utilized.

Ethnographic techniques (focused around in depth interviews) were used in order better understand the situated use of telehealth. After telehealth had been framed within communication scholarship, I outlined my epistemological standpoint in terms of research design and methods of data collection used. I provided the reader with a snapshot of the field experience, the most exciting facet of doing a study of this nature, and outlined the limitations of the research design.

The field of feminist technology assessment (e.g. Morgall, 1993 and Bush, 1983) provided an epistemological framework for the study. Qualitative methods were used in data collection, and grounded theory was used in the process of coding data. Originally a mixed-methods approach was anticipated; however, constraints in the field resulted in a

change in the methods used. Feminist technology assessment's focus on the user context was crucial in my research design, as understanding the user perspective enabled insights that would not have emerged otherwise, and helped me to understand the different constraints that users faced depending on their job. For example, the reiteration of the magnitude of technical problems was more important to the nurses in remote areas who would have to attempt to fix the system, whereas liability was more important to non-unionised physicians.

Theories about work practice were then explored in order to examine telehealth at the micro, meso and macro levels of analysis. This enabled me to understand the problem from multiple levels, providing a much richer picture of telehealth than a single level would have achieved. Micro insights such as the liability issues regarding metal health assessments pushed me to ask questions regarding telehealth procedures at a meso level. Having learned about Health Labrador's broader questions of privacy and liability at the meso management level, I then began the macro level task of creating a telehealth policy map. The macro overview of federal connectivity programs also provided background about why telehealth emerged as a topic of renewed concern in the Labrador context. These multiple perspectives enabled a much more coherent understanding of why telehealth was not being used as expected. In the previous chapter I attempted to let the data speak for itself as much as possible. Through the use of quotations I outlined how the theory discussed in Chapter Two played out in practice from the field data.

Review of Research Findings

Evaluating telehealth's potential from a situated micro standpoint provided vast insights into the challenges facing rural health care providers and technologists

attempting to incorporate videoconferencing into their daily work practices. With a revolving door of telehealth coordinators and pilot project funding cycles, building capacity in telehealth is a genuine challenge. Yet it seems that building technological capacity without first investing in human capacity is counterproductive to increasing access to health services. Creating a more balanced work environment for remote health care providers (e.g. where people are not on call 24 hours a day) should become a federal and provincial health priority to begin to address this problem.

The videoconferencing technology being used for telehealth is problematic in several ways. Firstly, the technology does not fare well in the harsh Labrador climate, creating the need for frequent technical interventions in hard to reach remote areas. Secondly, the need to book bandwidth ahead of time demonstrates inflexibility in the technological system that does not correspond to the unpredictable nature of work in health care. As a reliable technology that health care workers know and trust, primary reliance on the telephone as a means of bridging distance is likely to continue in the Labrador context. It seems that in this case the low-tech option of the telephone is often the most appropriate means of getting the job done.

A chronic shortage of staff means that health care workers in Labrador face many competing demands for their time. Telehealth needs to function as a simple and seamless form of health services delivery, rather than one that adds extra tasks to the workday and is often considered unreliable. Health care workers need to play a central role in designing how telehealth will be integrated into the workplace, in order to best understand where and when using telehealth is most appropriate. While champions are important in moving telehealth forward, asking the nurses and physicians who are

expected to use the system what their telehealth needs are makes good sense when planning a telehealth program.

The cash-strapped health system is another in the layers of factors that makes the ongoing use of videoconferencing for telehealth questionable. With tight budgets, it is difficult to justify paying $75 per hour to use a system that has not been proven reliable. While the community economic development value of supporting SmartLabrador should not be dismissed, the cost of videoconferencing plays a key role in priority setting that cannot be ignored. It is more economically viable for SmartLabrador to pursue avenues where their videoconferencing services have been better utilized, such as in the justice system, rather than making large efforts in the health sector at this time.

Although the fiscal investment that telehealth requires is certainly an inhibitor of telehealth use in Labrador, conflict and trust also weigh in as important reasons why telehealth did not work as it was intended. The notion of "add health care, technology and stir" proved problematic. SmartLabrador had its clock ticking on a three-year timeline, working against a shipping season that ends in November. Health Labrador, however, wanted to proceed cautiously and respect the collective agreements to which it is bound. When these two visions of the pace of telehealth rollout collided and concerns about privacy and liability were raised, the sense of trust needed for these two groups to work well together weakened.[2] However, if SmartLabrador and Health Labrador had been able to refer to provincial policy regarding telehealth a great deal of this conflict could possibly have been avoided, as fundamental concerns such as privacy and liability should have been addressed through policy. The lack of provincial telehealth policy severely

[2] During the final defense of this thesis Dr. H. Siden suggested that the issues of privacy and liability have already been addressed for Medivacs and the telephone, raising the issue of building trust as perhaps more important than policy.

hampered the progress of telehealth in Labrador. Although this vacuum is currently being addressed at the provincial level, such policy is long overdue given the long history of telehealth in Newfoundland and Labrador.

Limitations of the Research

The telehealth field is large and diverse. In conducting this research, it became clear to me that my contribution would be a drop in the bucket of the large amount of research that remains to be conducted. I will now outline some of the limitations of my work, and suggest possibilities for future research.

Several stakeholder groups were integrated into the research design. However, one important group was not included: the patient population. This group, those whose health care services are affected by changes in telehealth systems, was left out of the discussion. Videoconferencing for telehealth is a relatively new service available in Labrador, and it was assumed that many patients would have had limited contact with the system. Thus, patients were not interviewed. This also reflects the scope of this project, and the limited time and fiscal resources available to conduct this research. Another barrier to interviewing patients is simply geographic: costs prohibited me from travelling to many parts of the region, and recruiting a broad sample of citizens would have been difficult given my reliance on my community partner for a great deal of my contacts. My reliance on my community partner was excellent in the context of health care providers, as it enabled me to access virtually all clinics administered by Health Labrador, but I feel that it could have potentially positively biased the patient perspective had interviews with patients been pursued. By putting me in touch with people they had worked with, I would

have interviewed people who by association with SmartLabrador may have had a more positive perspective on technology than the average patient.

A potential future research opportunity would involve returning to Labrador to discuss the technology needs of citizens with respect to health care, and relate these needs to current practices in telehealth and in relation to online health information. This research could be conducted through a participatory action research model. An interesting point of intersection would be the varied and common needs among the three major Aboriginal communities in Labrador (the Innu, the Inuit and the Métis). However, as stated above, this is beyond the scope of the current project.

Conclusion

There are clearly many challenges facing rural and remote health care practitioners working in Labrador. Telehealth has been offered as a means of ensuring quicker access to better care and has been framed in an overarching perspective of the technological fix. The SmartLabrador project, under the constraints of Industry Canada's *Connecting Canadians* program, attempted with very limited success to implement a new medium of communication into health service delivery in Labrador.

Clearly, the fascination with conquering space so prominent in Canadian telecommunications policy is at play in Labrador. However, unlike many others enamoured with the compression of space, health care workers in the region are highly restricted by geography. It may seem only logical that such a huge physical area would benefit by real time technologically mediated communication. However, thinking about the geographic context separately from the socio-technical context has limited utility. While isolation is a problem in the area, the other barriers, symptomatic not only of

isolation but also of the intense austerity in the health system and a general undervaluing of the health needs of remote communities combine to make it extremely difficult to expect more than a very limited level of uptake of telehealth services. This, in turn, invokes the question of whether or not telehealth is an appropriate means of spending health care dollars, especially as the system is continually stretched further in light of other increasing costs and fleeting health care budgets.

The question of managing expectations is important in this case. While the grassroots base of SmartLabrador should be applauded, the expectations of high uptake of telehealth in a very short time are indicative of the short term federal policy vision that poisons the potential of SmartLabrador and Health Labrador to create sustainable increases in access to health services. Cycling pilot projects often end up at the same place where they begin, and more emphasis needs to be placed on long term goals, planning and sustainability if telehealth is to emerge as a way of genuinely improving access to care (rather than simply creating frustration and disillusionment). Additionally, focusing on the ways in which people work, the constraints they face, and the priorities they set in getting the job done will reveal more about how a telehealth program should be designed. This requires listening to workers, the real experts in the telehealth arena, and providing them with the training and support necessary to enable them to use telehealth. It also means providing health boards with the policy support they need in areas such as liability and privacy, rather than perpetuating a haphazard policy environment. Both administrators and workers have demonstrated their commitment to providing health services in areas that have difficulty accessing them, and now the

research and policy communities must listen to them when making recommendations and actually writing policy.

Clearly, the binds of time, evidenced by technical problems and liability issues (e.g. the preference of a face-to-face interaction over one mediated by videoconferencing) are ongoing. The challenges of new technological implementation remain. However, it is crucial to take technology outside of the black boxes of the "tech fix" and determinism in order for the practical, situated use of technology to be considered. As such, the users, in this case the health care provider and the patient, must be considered as the focal point of systems design and evaluation. Only then will the actual enabling or disabling features of telehealth come to light.

In the mean time, however, large amounts of money are being spent on the technologization of health services. Is this technology being used as a panacea for the more serious problems of unemployment, poor access to fresh produce and limited access to health services? While technology is an important means of accessing information and enabling communication, it must not be treated as a cure-all, nor should it be expected to fix problems that are social in nature. Telehealth may eventually become an integrated means of delivering health services, but until that time comes, it remains primarily important to provide rural and remote communities with the resources necessary to live in them. No new technology should be an excuse for standards of care that would not be tolerated in Canada's cities.

APPENDIX A
Ethics Approval

SIMON FRASER UNIVERSITY

OFFICE OF RESEARCH ETHICS

BURNABY, BRITISH COLUMBIA
CANADA V5A 1S6
Telephone: 604- 291-4370
FAX: 604-291-4860

January 11, 2002

Dr. Ellen Balka
School of Communication
Simon Fraser University

Dear Dr. Balka:

Re: From Work Practice to Public Policy: A Case Study of the Canadian Health Information Infrastructure
SSHRC

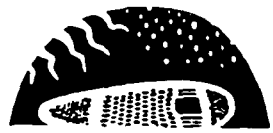
I am pleased to inform you that the above referenced Request for Ethical Approval of Research has been approved on behalf of the University Research Ethics Review Committee. This approval is in effect for a period of three years from the start of the research project or for the term of your faculty appointment at SFU, whichever comes first. Any changes in the procedures affecting interaction with human subjects should be reported to the University Research Ethics Review Committee. Significant changes will require the submission of a revised Request for Ethical Approval of Research.

Best wishes for success in this research.

Sincerely,

Dr. Hal Weinberg, Acting Director
Office of Research Ethics

c: K. Messing, Co-Investigator
P. Armstrong, Co-Investigator
B. Lewis, Dean
/bjr



Health Labrador Corporation
Regional Offices
P.O. Box 7000, Stn. "A"
Happy Valley-Goose Bay
Labrador, NF
A0P 1S0

June 4, 2003

Katrina Peddle
P.O. Box 41
Forteau, NL
AoK 2P0

Dear Ms. Peddle,

The Research Ethics Committee of Health Labrador Corporation have given approval for the organization to participate in the study "From Work Practice to Public Policy: A case Study of the Canadian Health Information Infrastructure".

I would be interested in receiving a copy of the study results once completed. Good luck with the project.

Sincerely,

Norma Forsey
Regional Director,
Staff Development/Quality Initiatives

CC: Dr. Ellen Balka,
School of Communication, Simon Fraser University,
8888 University Drive, Burnaby, BC V5A 1S6

NF/dmw

Memorial
University of Newfoundland

Office of Research and Graduate Studies (Medicine)
Faculty of Medicine
The Health Sciences Centre

July 9, 2003

TO: Dr. E. Balka

FROM: Dr. F. Moody-Corbett, Assistant Dean
Research & Graduate Studies (Medicine)

SUBJECT: Application to the Human Investigation Committee - #03.103

The Human Investigation Committee of the Faculty of Medicine has reviewed your proposal for the study entitled "From work practice to public policy: A case study of the Canadian health information infrastructure".

Full approval has been granted for one year, from point of view of ethics as defined in the terms of reference of this Faculty Committee.

For a hospital-based study, it is your responsibility to seek necessary approval from the Health Care Corporation of St. John's.

Notwithstanding the approval of the HIC, the primary responsibility for the ethical conduct of the investigation remains with you.

F. Moody-Corbett, PhD
Assistant Dean

FMC/jjm

cc: Dr. C. Loomis, Vice-President (Research), MUN
Mr. W. Miller, Director of Planning & Research, HCCSJ

St. John's, NF, Canada A1B 3V6 • Tel.: (709) 777-6762 • Fax: (709) 777-7501 • email: rgs@mun.ca

APPENDIX B

SIMON FRASER UNIVERSITY

Ellen Balka, Ph.D.
School of Communication,
8888 University Dr.,
Burnaby, British Columbia,
CANADA V5A 1S6

Phone: (604) 291-3764
(604) 291-3757
Fax: (604) 291-4024
E-mail: ebalka@sfu.ca

INFORMED CONSENT BY PARTICIPANTS TO PARTICIPATE IN A RESEARCH PROJECT

Simon Fraser University and those conducting this project subscribe to the ethical conduct of research and to the protection at all times of the interests, comfort, and safety of those who participate in research. This form and the information it contains are given to you for your own protection and full understanding of the procedures. Your signature on this form will signify that you have received a document which describes the procedures, possible risks, and benefits of this research project, that you have received an adequate opportunity to consider the information in the document, and that you voluntarily agree to participate in the project.

Having been asked by Dr. Ellen Balka, of the School of Communication of Simon Fraser University, or one of her research assistants or collaborators, __Katrina Peddle___ (named here), to participate in a research project, I have read the procedures specified in the document INFORMATION SHEET FOR SUBJECTS: **From Work Practice to Public Policy: A Case Study of the Canadian Health Information Infrastructure.** I understand the procedures to be used in this research, as well as the potential risks and benefits to me in taking part in this research.

I understand that if I consent to participate in this project that I may withdraw my participation *in this project at any time.*

I also understand that I may refuse to participate in this project and that if I do refuse to participate in this project that there will be no repercussions for such a refusal.

I have been informed that research material (answers to questions I have been asked and, in the event that I have consented to have photographs or videotapes taken of me, any photographs or videotapes taken of me) will be kept confidential by Dr. Ellen Balka, to be used only by staff and research collaborators involved with this project.

I understand that that if I consent to being photographed or videotaped that images resulting from these photos or video tapes may be shown to those participating in this research at Simon Fraser University, and may be used to communicate research results to scholarly audiences, unless I indicate to the researcher(s) after being photographed or videotaped that I do not want images of me used for the purposes of communication of research results.

I understand that my supervisor or employer has granted permission to Dr. Balka's research team to conduct the study described on the INFORMATION SHEET FOR SUBJECTS: From

Work Practice to Public Policy: A Case Study of the Canadian Health Information Infrastructure, but that I may still choose not to participate in this study.

I understand that I may register any complaint I might have about the project with the researcher named above, or with Dr. Martin Laba, Director, School of Communication, Simon Fraser University, Burnaby, B.C. V5A 1S6 (e-mail laba@sfu.ca).

I may obtain copies of the results of this study, upon its completion, by contacting:

Ellen Balka, Ph.D.
School of Communication,
8888 University Dr.,
Burnaby, British Columbia,
CANADA V5A 1S6

Phone: (604) 291-3764
(604) 291-3757
Fax: (604) 291-4024
E-mail: eballa@sfu.ca

I agree to participate by:	YES	NO
• answering questions about my use of technology in a work setting;	___	___
• having answers to questions about my use of technology tape recorded;	___	___
• allowing the researcher(s) to observe my use of technology in a work setting;	___	___
during the period from June 4, 2002 through December 31, 2003.		
I wish to have my identity remain anonymous:	___	___

If you would like to have your identity remain anonymous, what pseudonym should we use in referring to you or your interview in future presentations or publications?

I would like to be referred to in the context of this research as _____

NAME (please type or print legibly): _____

ADDRESS: _____

_____

SIGNATURE of participant: _____

WITNESS: (type or print) _____ SIGNATURE _____

DATE: _____
PLACE: _____

ONCE SIGNED, A COPY OF THIS CONSENT FORM AND A SUBJECT FEEDBACK FORM SHOULD BE PROVIDED TO THE SUBJECT.

Facility/ Unit: _____ Form #_____ BU: _____

SIMON FRASER UNIVERSITY
UNIVERSITY RESEARCH ETHICS REVIEW COMMITTEE
PARTICIPANT FEEDBACK FORM

Completion of this form is **OPTIONAL**, and is not a requirement of participation in the project. However, if you have served as a participant in a project and would care to comment on the procedures involved, you may complete the following form and send it to the Chair, University Research Ethics Review Committee. All information received will be treated in a strictly confidential manner.

Name of Principal Investigator: Dr. Ellen Balka
Title of Project: From Work Practice to Public Policy: A Case Study of the Canadian Health Infrastructure
School/Faculty:
School of Communication, Simon Fraser University, Burnaby, B.C. V5A 1S6.

Did you sign an Informed Consent Form before participating in the project?
(Yes or No)

Were there significant deviations from the originally stated procedures?
_____ (Yes or No)

I wish to comment on my involvement in the above project, which took place:

_____
(Date(s)) (Place) (Time)

Comments:_____

_____

_____

_____

_____

_____

Completion of this section is optional
Your name: _____
Address:_____
Telephone: (w)_____ (h)_____
E-mail:_____

This form should be sent to the Chair, University Research Ethics Review Committee, c/o Office of the Vice-President, Research, Simon Fraser University, Burnaby, BC, V5A 1S6.

APPENDIX C

Interview Questions

Nurses/Administrative Assistants

General

1. How long have you been working in health care in Labrador?

Travel

1. Do you have to travel to provide care for patients? If so, how often do you have to travel? How far do you have to travel? Do they have to overnight out of town? What staff groups are most affected by travel?
2. Do you have patients that travel to your area to receive care? If so, how often do they have to travel? If so, how far do they have to travel?
3. Where do patients stay when they are in town for medical consultations?

Work Constraints

1. Can you describe an average day?
2. What are the constraints that you encounter in your day to day tasks?

Technology

1. What kinds of tools do you use in the average work day?
2. Do you use a computer at work? If you do, what do you use it for?
3. How did you learn to use your computer?
4. If you have a problem with a computer, what do you do? Who do you call?
5. Do you use technology in your day to day work? If so, what kinds of technology do you use? Are some kinds of technologies more problematic than others?
6. Are the staff paid to attend training sessions (ask if it comes up, otherwise add a question about staff training)?
7. What does telehealth mean to you?
8. Have you used telehealth? Can you describe the applications you've used?
9. How did you hear about telehealth?
10. Have you been involved with the Smart Labrador project? Have you used their facilities?
11. Do you think telehealth would help or inhibit your work and the work of your staff?
12. Have you been asked to participate in telehealth applications?
13. What do you think the potential advantages and disadvantages of telehealth are?
14. Why has there been low use of telehealth applications in this area?
15. What kinds of tools do you use in an average work day?
16. Do you use technology in your day to day work? If so, what kinds of technology do you use?
17. What constraints do you face in your job?
18. Do you use computers on a regular basis?
19. How do you learn to use computers and new technology, like videoconferencing?

20. What does telehealth mean to you?
21. Do you think telehealth could help or inhibit your work?
22. Can you describe the telehealth applications you have used?
23. How long have you been involved in telehealth?
24. Does Health Labrador have a telehealth policy?
25. What, would you say, does SmartLabrador do? Does the mandate of SmartLabrador fit with your needs as a health board?
26. What constraints exist for you in using telehealth in general, and specifically with respect to Smart Labrador?

Health Managers

General

1. How long have you been working in health care management?
2. How long have you worked in Labrador?
3. How many staff do you have?
4. How long have staff been in their current jobs?

Travel

1. Do you have staff that travel to provide care for patients? What roles/professions are they in? If so, how often do they have to travel? How far do they have to travel? Do they have to overnight out of town? What staff groups are most affected by travel?
2. Do you have patients that travel to your area to receive care? If so, how often do they have to travel? If so, how far do they have to travel?
3. Where do patients stay when they are in town for medical consultations?

Work Constraints

1. Can you describe an average day?
2. What are the constraints that you encounter in your day to day tasks?

Technology

1. What kinds of tools do you use in the average work day?
2. Do you use a computer at work? If you do, what do you use it for?
3. How did you learn to use your computer?
4. If you have a problem with a computer, what do you do? Who do you call?
5. Do you use technology in your day to day work? If so, what kinds of technology do you use? Are some kinds of technologies more problematic than others?
6. What kinds of tasks do your staff do in their everyday work?
7. What kinds of constraints do your staff face?
8. Do they use computers on a regular basis?
9. If the staff encounter problems with a computer, what do they do?
10. How do your staff learn to use computers and new technology?
11. Are the staff paid to attend training sessions (ask if it comes up, otherwise add a question about staff training)?
12. What does telehealth mean to you?
13. Have you or your staff used telehealth? Can you describe the applications you've used?
14. How did you hear about telehealth?
15. Have you heard of the Smart Labrador project? If yes, what, would you say, does Smart Labrador do?

16. Have you been involved with the project? Have you used their facilities?
17. Do you think telehealth would help or inhibit your work and the work of your staff?
18. Have you been asked to participate in telehealth applications?
19. What do you think the potential advantages and disadvantages of telehealth are?
20. Why has there been low use of telehealth applications in this area?

Smart Labrador Staff

General

1. How long have you been working with Smart Labrador?

Travel

1. How large of an area do you cover? Do you travel extensively for work?

Work Constraints

1. Can you describe an average day?
2. What are the constraints that you encounter in your day to day tasks?

Technology

1. What kinds of tools do you use in the average work day?
2. What kinds of technology do you use in your day to day work? Are some kinds of technologies more problematic than others?
3. What would you say is the primary goal of Smart Labrador?
4. What does telehealth mean to you?
5. How have you been involved in telehealth? Can you describe the applications you've help to set up?
6. What has been the reaction to Smart Labrador's efforts to establish telehealth services in the area?
7. Do you think telehealth would help or inhibit the work of health care staff? How?
8. Have you been asked to participate by a health care worker in telehealth applications?
9. Do you have direct contact with health care workers, like nurses?
10. What do you think the potential advantages and disadvantages of telehealth are?
11. Why do you think telehealth applications have not been used as much as anticipated in this area?

APPENDIX D

Coding Categories[2]

Actors
Artifacts
Capacity
- Capacity building
- Champion

Change management
- Control
- Evaluation
- Evolution
- Trust

Commodification
- Financial Administration
- Patterns of Ownership
- Profit

Communication
- Definition of telehealth

Conflict
Consent
Constraints
- Timeline
- Training

Environmental Context
- Access to health services
- Community Health Need
- Food security
- Income determinant of health
- Population health

Occupational health and safety
Organizational Motivations
- Sustainability

Politics
- Personal motivations

Public policy
- Accountability

[2] The coding categories were created in part by Zena Sharman and Brandi Bell, as part of the larger SSHRC standard grant, *From Work Practice to Public Policy.*

- Confidentiality
- Liability
- Public policy - meso level
- Privacy
- Standards
- Sustainability

Spatialization

- Cultural and spatial identity
    - Cultural context
    - Geography

Structuration

- Institutional Structures
    - Macro actors
    - Meso actors
    - Micro actors
    - Occupational structures

Technology

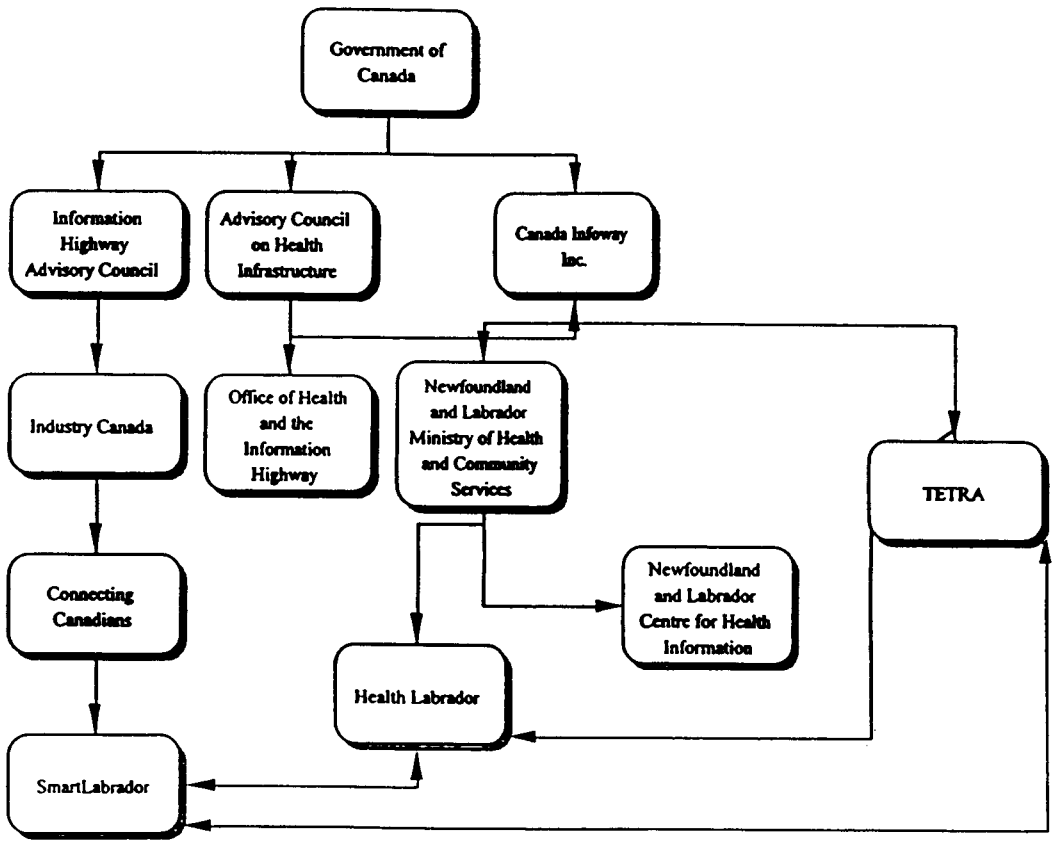
- Context
- Appropriateness
- Fear of technology
- Rate of uptake
- Technology and spatialization
- Technology design

User context

- Continuing Medical Education
- Professional Practice
- Reliability
- Situated use
- Skill transfer
- Staff turnover
- Work
    - Work arounds
    - Work design~work organization
    - Work process~micro level
    - Work practice
    - Workload
    - Workplace gender relations
    - Invisible work

APPENDIX E

Overview of Macro Links Between Actors



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