Understanding the Work of Telehealth Implementation Using Normalization Process Theory

by

Janet Gwyneth Morrison

M.A. (Library and Information Studies), University of British Columbia, 2003
M.Ad.Ed. (Adult Education), Saint Francis Xavier University, 1999
B.H.Sc. (Nursing), Open University, 1992

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Name: **Janet Gwyneth Morrison**

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Examining Committee:

Chair: **Barry Truax**
Professor

Dr. Richard Smith
Senior Supervisor
Professor

Dr. Gary McCarron
Supervisor
Associate Professor

Dr. Peter Chow-White
Supervisor
Associate Professor

Dr. Elicia Maine
Internal Examiner
Associate Professor, Beedie School of Business

Dr. Carl May
External Examiner
Professor. Health Sciences
University of Southampton

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Abstract

This dissertation uses the theoretical constructs of Normalization Process Theory (NPT) to examine the successful implementation of an innovative telehealth service that delivers occupational health nursing services to a large healthcare employee population over a wide geographic area.

Telehealth services have come to be regarded as a possible means to improve access to health care services, clinical efficiency, and cost effectiveness in an era where there are shrinking resources and growing health care demands. Yet there is still much to be learned about how these complex interventions advance beyond pilot projects to become the normal way of working.

Using a case study of a successful re-organization of occupational health nursing services, the study used qualitative data collection methods: semi-structured interviews, analysis of documents, and site observations. Data were analyzed using the framework method of analysis informed by the constructs of NPT.

This study adds to a growing literature that supports the utility of NPT in identifying the work necessary to successfully implement complex interventions in healthcare settings. It underlines the importance of understanding technology as practice, and suggests prospective applications of the theory.

Keywords: Normalization Process Theory; occupational health nursing; health services research; instrumental case study; qualitative research methods.

For Dave, who always knew this would happen.

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Glossary

The following are terms or topics mentioned in the study that might not be familiar to the reader.

Blood and Body Fluid Exposure (BBF)	"BBF" exposure refers to accidental contact with the blood or body fluids of a patient or health care client. It is assumed that all blood and body fluids are infectious for blood borne diseases (for example, hepatitis B and C, HIV) therefore when contact occurs it is treated as an infectious exposure. Health authorities have standard protocols to follow when BBFs occur and these include contacting the source physician, obtaining and testing blood from the source and, if necessary, treatment of the exposed worker with anti-retroviral drugs. Occupational Health Nurses are often the co-ordinators of these protocols.
Complex Intervention	Complex interventions are defined as combinations of policies, procedures and information and communication technologies that are used as a deliberately initiated attempt to introduce new, or modify existing, patterns of collective action in health care. Deliberate initiation means that an intervention is institutionally sanctioned; formally defined; consciously planned; and intended to lead to a changed outcome (May, 2010).
Implementation	"All activities that occur between making an adoption commitment and the time that an innovation becomes part of the organizational routine, ceases to be new, or is abandoned. The behaviour of organizational members over times evolves from avoidance or non-use, through unenthusiastic or compliant use, to skilled or consistent use" (Linton, 2002, p65).

Normalization	The routine embedding of a practice in everyday work. Normalization outcomes to be considered include: level of use, increasing use over time, amount of shift from one practice to another; disappearance of a previous practice, reported acceptability of a practice; or measures of quality work stemming from use of the practice. "When a practice ceases to be 'new' or no longer requires additional effort, it may be framed as having become normalized" (Finch, Mair, O'Donnell, Murray, & May, 2012, p. 3).
Occupational Health Nurse (OHN)	A registered nurse with advanced preparation in the areas of occupational health and safety, disability case management, and occupational communicable disease management.
Practice	An ensemble of beliefs, behaviours, and acts that manipulate or organize objects and others (May & Finch, 2009, p. 542).
Telehealth	"The use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration" (U.S. Department of Health and Human Services, n.d.).
Work	"Purposive social action that involves the investment of personal and group resources to achieve goals" (May & Finch, 2009, p. 539).

1. Understanding the Work of Telehealth Implementation Using Normalization Process Theory

Anyone who has tried to introduce a new policy, procedure, or technology in an organization knows that orchestrating successful change is a difficult process. This project studies the human dynamics involved in the implementation of health information technologies and the routine embedding of practice. The research examines a complex organizational intervention using the constructs of Normalization Process Theory (NPT) as described by and May et al. (2007) and May and Finch (2009). NPT is based on the idea that there is specific work by human actors that defines and organizes complex interventions (combinations of policies, procedures and information and communication technologies) and seeks to answer how new ways of thinking, acting and organizing become embedded in everyday work activity so that they become the normal way of working.

This chapter begins with a discussion of the background and context of the study and introduces the research problem and questions. The chapter also includes a brief introduction to the research approach and methods – these areas will be fully discussed in subsequent chapters along with a discussion of my motivation for the study and its rationale and significance. The section concludes with definitions of key terms and an outline of the structure of the document.

1.1. Background and Context

Universal access to health care is a defining Canadian social value yet, there is increasing concern that against a background of economic uncertainty, regional disparities in access, an aging population, and rapidly rising costs, Canada's health care system may be unsustainable in the long term. This concern has created interest in

technological innovations as a means to improve delivery efficiency, cost effectiveness, and safety. While technology is often portrayed as a solution and many examples of successful implementations exist, the literature also contains ample evidence of failed technologies and wasted resources – promising systems, devices, procedures and policies that apparently had adequate financial, professional and organizational support but for some reason never quite met the needs and expectations of the participating professionals, patients, or the health care system itself (Finch, Mair & May, 2007; Mair, Hiscock & Beaton, 2008; May, Gask, Atkinson, Ellis, Mair & Esmail, 2001). Some of these technologies fail outright (see for example Balka, & Whitehouse, 2007), though more often they undergo modifications or workarounds that derail their intended use and/or reduce their effectiveness. Ultimately they fail to become part of 'normal' work. These failed technologies take a substantial toll on the financial and human resources of the healthcare system. With millions of dollars at stake (sometimes billions as in the case of the Canada Health Infoway project to implement a national electronic health records system[1]) there is great value in exploring the social and organizational factors that facilitate or inhibit the successful normalization of complex interventions in health care.

1.2. Research Problem

Telehealth and E-health are terms that are sometimes used interchangeably. For the purposes of this study I will be using the term telehealth. Telehealth is defined as “the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration” (U.S. Department of Health Services, n.d). Some examples of telehealth applications include the use of health information networks, electronic health record systems, health portals, telemedicine, and personal wearable and portable communication systems (BCATPR, n.d.).

[1] Canada Health Infoway Annual Report 2012-2013.

Telehealth programs have often been implemented in an attempt to apply a technological solution to the problems of regional disparities in care, limited resources, and large geographic /demographic/healthcare provider distances. In British Columbia the Ministry of Health Service Plan for 2014-2017 states an intention to "expand telehealth to support patients with chronic diseases, mental health issues, and substance abuse and to provide access to specialist and acute care services in remote service areas" (B.C. Ministry of Health, 2014).

The National Health Services (NHS) in the United Kingdom has a long history of experimentation with telehealth and telemedicine programming and has followed a policy of outcome evaluation. Research based on these evaluations showed that many of these programs failed to normalize, that is, they failed to become part of professional practice and become the normal way of working in the healthcare system (House of Commons Health Committee, 2005).

1.3. Theory Selection

In a project initiated following an NHS Board of Inquiry into telehealth failures, researcher Carl May and his team performed a secondary analysis of existing data gathered during the course of medical technology assessments – a total of 23 qualitative studies conducted by the British Medical Research Council over the period of 1995 to 2005. From this analysis May and his team identified four key components that appeared to influence program success or failure and used these components to develop the normalization process model (May et al., 2007; May and Finch, 2009). In subsequent studies, these components were refined and validated as the basis of Normalization Process Theory (NPT) (May et al., 2009).

NPT has been developed as a middle range theory. Middle range theories aim to integrate theory and empirical research. They are generally structured by three criteria. The first is substantive foundation, that is, they have specified assumptions that describe and explain empirical phenomena. Secondly they have structural integrity – the theoretical concepts are defined and their relationships are logically represented in a

model. Finally they have functional adequacy and can be applied to a variety of practice environments (Boudon, 1991).

NPT is a relatively new middle range theory and as such has mainly been applied in the post-hoc examination of project failures (McEvoy, Ballini, Maltoni, Mair, & MacFarlane, 2014). Few studies have tested NPT's value to explain program successes. Therefore in this study I have chosen NPT to examine a successful complex implementation with the aim of testing NPTs utility for this purpose.

1.4. Assumptions

NPT is structured around some general assumptions. Firstly it assumes that interventions become part of routine practice as a result of the work of human agents working either individually or in groups. May (2013a) points out that this "specifies the object of the theory as ensembles of practices, behaviours, beliefs, and operations that are accomplished by agents when they bring an innovation forth" (May 2013a, p. 27). Secondly, May notes that this work takes the form of generative mechanisms that are "the product of investments in human agency" in the form of "investments in the meaning, commitment, effort, and appraisal of innovations" (p. 27). These are categorized in NPT as the constructs of coherence, cognitive participation, collective action and reflexive monitoring. It is understood that these constructs are shaped by organizational, professional, and social rules, conventions, and norms. Finally, it is assumed that normalization of the innovation requires the ongoing investment of meaning, commitment, effort and appraisal by those involved (May, 2013a).

1.5. Study Purpose and Research Questions

The purpose of this study is to contribute to theory by evaluating the utility of the constructs of Normalization Process Theory (NPT) to understand the successful normalization of a complex intervention. Using an instrumental case study format, the complex intervention chosen for the study will focus on the implementation of an innovative telehealth service intended to provide occupational health service in a large

suburban health authority. Not only did this new service re-orient occupational health prevention services in this health authority, but it radically changed the scope and practice of the occupational health nurses, introduced the use of an occupational health call centre approach, and implemented the use of a unique electronic health record and health events tracking system. Unlike many complex interventions, the Workplace Health Call Centre (WHCC) has been successful and has become the normal way of working in this health authority. In fact, it has been so successful that from an initial implementation in one health authority, it was expanded to serve health care workers in the entire province – a total of 110,000 employees. In this case of radical change do the constructs of NPT offer any explanations why this implementation has been successful?

Much of the literature of organizational change is broadly focused, examining the work of groups or the dynamics of the organization at large in the change process. NPT however, is based on the idea that changes to work practices are complex interventions affecting the social and technological structure of the workplace and that success or failure is the result of specific work done by individual human actors. Therefore, the following research questions are addressed:

1. During this implementation, who were the key actors and what specific work did these actors engage in to normalize the intervention?
2. How is this work understood by those involved?
3. Does Normalization Process Theory accurately identify the factors that led to the normalization of this complex intervention?

1.6. Research Approach and Methods

The study was organized around an instrumental case study and used qualitative data gathering and analysis methods. Fieldwork began following approval of the research proposal by my doctoral committee and ethical approval from the Simon Fraser University Office of Research Ethics, and ethical approval and permission to proceed from the Fraser Health Research Ethics Board. In-depth, semi-structured interviews were the primary data collection instrument. A total of 11 interviews were conducted with 4 formal follow up interviews and several informal interviews. Data were also collected by direct observation and an analysis of organizational documents and this

information was used to triangulate certain portions of the data arising from the interviews. Key informants were used to verify details in the case study.

The data was managed using the *framework method* as described by Ritchie, Spencer and O'Connor (2012). Using this method data from the interviews, observational logs, and documents were initially coded using in vivo thematic analysis and then categorized using the theoretical constructs of NPT.

1.7. Motivation for the Study

I have an extensive background in occupational health nursing with over 30 years experience both as a practitioner and as an educator. In my professional role I have personally attempted to implement organizational change and I have witnessed the attempts of others to implement change with a wide range of outcomes: successful, unsuccessful and disastrous. Over the course of my career, spent in several large organizations, I saw that the stress and uncertainty of organizational and technological change had a huge impact on worker health and wellbeing. In fact, I came to realize that a large part of my role as an occupational health nurse involved mitigating the negative effects of complex interventions — for example, poorly designed equipment or work processes that caused injuries; and changes to work or work practices that resulted in workplace stress and its effects: cardio-vascular disease and psychological illnesses such as depression, anxiety and anger issues leading to absenteeism and disability. The realization that a great deal of occupational injury and illness was the result of poorly implemented complex interventions led me to seek alternatives.

During my graduate study in adult education my thesis topic examined the use of adult education principles in bringing about organizational change in health and safety practices. As the occupational health nurse employed by a large clinical laboratory I noticed that some employees were beginning to show symptoms of latex allergy. Since latex allergy can be a potentially fatal condition it was imperative that this risk should be mitigated. To me, this seemed like a problem that should be easy to solve — get rid of latex gloves — however, my naive assumption of a simple solution proved to be very wrong. Eliminating latex hazards present in the workplace became a two-year process.

There were several factors at play that hindered this organizational change. First of all, the very existence of latex allergy was not widely known at the time. It had been written about in the specialist literature but not in the mainstream medical journals. Secondly, healthcare workers had been (mistakenly) trained that latex gloves were the "gold standard" in protection against blood borne diseases and while there were acceptable synthetic alternatives it took a significant re-education effort to bring about acceptance of non-latex gloves. Bringing about the change also required attention to political and structural aspects of the organization, for example, negotiating with the finance and purchasing departments who feared escalating costs and the loss of financial and functional control. Although the experience was helpful to me in understanding the power structures of organizations and the role of advocacy and education in organizational change, there seemed to be other factors at play that could not be explained or solved using adult education principles.

In subsequent graduate study in the field of library and information science I encountered the work of Rob Kling and his conception of social informatics (Kling, 1999; Kling, Rosenbaum & Sawyer, 2005). Kling's notion that information and communication technologies tend to favour the status quo, create winners and losers, have paradoxical effects, and have moral and ethical aspects that create social consequences made sense to me in light of what I had seen in the workplace and sparked my interest in examining the socio-technical aspects of organizational change. I found many of these threads came together in the work of Carl May (2009) and the new field of NPT. I particularly liked NPT's focus on the actual work of change and its tacit understanding that ultimately the successes or failures of organizational change are often determined, not in the board room, but at the level of individual actors and work groups. I had certainly seen examples of this in various workplaces and on reflection; it explained many of the difficulties I had experienced in the latex elimination project. I became interested in testing NPT's utility and began a search for a suitable case study.

1.8. Rationale and Significance

Past failures and inadequacies have not diminished interest in the use of information and communication technologies to deliver health care at a distance. In fact

improvements in technology, and particularly the advancement of mobile technologies, have increased interest in the development and implementation of mediated health care in both the developed and developing world. NPT offers a framework that may increase the success rate of these projects. Therefore the significance of this study relates to: providing evidence that supports the theoretical constructs of NPT; demonstrating NPT's application to practice and; providing evidence that would support the incorporation of NPT assessment as institutional policy prior to the implementation of socio-technical change.

1.9. Structure of the Document

Chapter 1 introduced NPT as the topic of this study and using examples from my personal experience of organizational change described why this topic was of interest to me and its possible utility as an aid to organizational policy. In the following chapter I will outline the literature relative to organizational change in healthcare and the theoretical perspectives of NPT. Chapter 3 discusses the methodology and methods used for data collection and analysis. Chapter 4 is a detailed description of "the case" – the development and implementation of the Workplace Health Centre. In Chapter 5 I describe how the data was analyzed and discuss the results of the analysis. Chapter 6 examines and discusses the research questions in light of the findings and finally, Chapter 7 concludes with limitations of the study and recommendations for further research.

2. Review of the Literature

This study applies the constructs of NPT to an instrumental case study that describes the successful implementation of a complex intervention in a large healthcare setting. This intervention not only saw the re-organization of established professional practice and a new way of working for a group of nurses, but it also involved the introduction of a health information technology system. Understanding how change is facilitated in organizations and professional practice and how complex interventions become successfully normalized in healthcare has become an important topic in an era where increasingly, health information and communication technologies are being layered on the already complex socio-technical system of health care service delivery.

NPT focuses on the dynamic processes involving the work of individuals and the social interactions that determine how and why complex interventions become routine, everyday practice. As a theory that attempts to explain how these changes take place it draws on a rich literature from a variety of academic disciplines: business, healthcare management, psychology and sociology. It also draws on the social constructivist perspective, notably from the tradition of the social shaping of technology (SST), and the principles outlined by social informatics (SI).

In the first section of this chapter I will begin with a discussion of some of the theories and methods that have been proposed to change professional practice and behaviour and to facilitate change in healthcare organizations. In the second section I will move on to key aspects of the SST approach, in particular social informatics, and show how these perspectives have informed the development of NPT. In the final section the theoretical perspectives of NPT and its conceptual framework will be discussed in detail. I conclude the section with examples of how NPT has been applied to date.

2.1. Theories of Change in Health Care

There is a rich literature that attempts to explain the facilitation of change. A recent review by Dickson, Lindstrom, Black and Van der Gucht (2012) detailed 43 evidence-informed approaches — models, theories, techniques and tools – that can be applied to organizational and behavioural change management in healthcare. Examples of these complex interventions can range from new policies and procedures, the integration of new technologies, changes to professional practice by the introduction of practice guidelines and standards, or health promotion initiatives aimed at changing individual health behaviours and attitudes. Sometimes these initiatives encompass all or many of these into one complex intervention. In the following section I will attempt to summarize and group the most prominent of these approaches in order to give a sense of the sheer breadth of this literature.

2.1.1. Process theories of change.

Theories of change described in the literature can generally be divided into two categories: process and impact theories (Rossi, Freeman & Lipsey, 1999). Process theories are concerned with the "how" of change – how the change can be organized for effectiveness and how the target group(s) will be influenced. One of the original models of organizational change in this category was Kurt Lewin's Field Theory (1951). Lewin's model of change is based on the idea that there is a current state and a desired future state. The current state is restrained by a "field of forces" that maintains the status quo. Lewin proposed that when "driving forces" — a crisis, a new competitor, or some other imperative for change — occur, there is an "unfreezing" and a willingness for change. As Burke notes, "the focus becomes developing a new mission, a new vision, a fresh image of the future ... one that is more desirable than the present state" (1987, p. 115). Once the future state is achieved "re-freezing" occurs that reinforces and stabilizes the new behaviours. In Lewin's conception, change management involves balancing the driving and restraining forces to either create or limit change. While it was originally proposed as a theory of organizational change, Field Theory has application to individual behavioural change. Behavioural change occurs when the forces supporting change have more influence than those that support the status quo, for example, an individual

may have a desire to exercise more but will only be successful if the forces that encourage that change are stronger than the forces than resist it.

Lewin's theory remained a staple of the organizational literature for several decades until the 1990s when its sheer simplicity made it a target of criticism. Kanter, Stein, and Jick dismissed it as "a quaintly linear and static conception – the organization as ice cube" (1992, p. 10) and La Marsh pointed out "change was once a discrete event with a beginning, middle and end. Today change is a constant: multiple changes happen simultaneously" (1995, p. 1). In spite of its simplicity Lewin's Field Theory was the prototype for other models that incorporate a "stages of change" approach. These models propose individuals or teams progress through various stages of behaviour change and that each stage is governed by diverse factors requiring different facilitation strategies. For example, Bridges' Transition Model proposes that individuals undergoing change must progress through three psychological stages for successful change: an ending and letting go; a neutral zone; and the acceptance of a new beginning (Bridges, 1991). Another change theory widely used in both the organizational literature and the field of health promotion is the "Trans-theoretical Model" or as it is usually referred to, the Stages of Change Model (Prochaska &Velicer, 1997). Prochaska and Velicer propose that individuals and groups go through various stages in their motivation and readiness to change and interventions need to be tailored specifically for each stage. Emphasis is placed on measuring change readiness because change is unlikely to happen if the necessary state of readiness is not present. Application of this theory can be found in health promotion programs that gauge participant readiness to change by asking about a desired behaviour change (for example to increase exercise by x amount) and how likely they are to undertake the activity in the immediate future (today, tomorrow, this week). If the participant is ready to undertake the activity then the program facilitates it; if they are not the focus changes to removing barriers to participation. Although widely used, the effectiveness of this theory has been questioned. A review of 37 randomized controlled trials conducted by Reimsma et al. (2003) found little evidence programs using this model were more effective than other interventions in client behaviour change.

2.1.2. Impact theories of organizational behaviour change.

Impact theories tend to focus on the behaviour of individuals, how they make choices or decisions and how those decisions can be influenced or shaped. Impact theories can be grouped into several, often overlapping, categories: educational, social, and organizational. Grol et al. note that impact theories describe how a specific intervention "...will facilitate a desired change, as well as the causes, effects, and factors determining success (or the lack of it) in improving health care" (2007, p. 103). Impact theories can be further grouped into those that apply to individuals, social contexts, and organizational factors. However, the distinction between process and impact theories is often not clear cut, and they often overlap. In fact, Grol et al. expressed the view that the ideal model for change should encompass both types of theories for maximum effectiveness.

Cognitive theories of change management focus on rational decision making processes. A range of these theories propose that changes to professional practices and procedures can be made by using educational approaches in an attempt to rewrite so-called knowledge "scripts" — the ways that practitioners have organized prior learning and knowledge about practice and the way things are done. This approach is consistent with the constructivist approach that defines learning as "what people do when they construct meaning from their experiences" ... and that ... "learning occurs as individuals reflect on their experiences both individually, and with others, to construct meaning in ways consistent with being member of a community of practice" (Slotnick & Shershneva, 2002, p. 198). Educational theories and examples of their application to behaviour change in healthcare professionals include: adult learning theory (Knowles, 1990; Stevens, Bader, Luna, & Johnson, 2011), transformative learning (Cranton, 1994; Samenow, Worly, Neufeld, Fisher, & Swiggart, 2013) and learning in communities of practice (Wenger, 1998; Davidson, 2011).

Motivational theories of change focus on individual's attitudes and intentions. Probably the best known of these is Aizen's Theory of Planned Behaviour (1991) that emphasizes the importance of intention to change. While this model builds on the previously mentioned Stages of Change model, Aizen insists that intentions are shaped by factors such as attitudes and perceived social, professional, and individual norms.

Aizen also added the concepts of internal and external controls as predictors of change. Internal control could be thought of as 'self-efficacy' that is, the degree to which individuals see themselves as sufficiently knowledgeable, skillful, disciplined and able to perform an act, and therefore more likely to succeed. External controls relate to things like the perceived cooperation of colleagues, available resources, or time constraints. The notion of external controls is an important feature of this theory since psychological theories of change have been criticized for their over-emphasis on personal agency (like the Stages of Change model) and their tendency to ignore the role of context (Finch, Mair, O'Donnell, Murray & May, 2012; Wensing, Van der Weijden & Grol, 1998).

Social influence theories of change overlap with, and combine, many of the principles described above, importantly they elaborate the notion that social context is a key factor in change. For example Bandura's Social Cognitive Theory (1986) suggests that feedback from respected peers or opinion leaders, and the modelling of desired behaviours by these individuals influences behaviour change.

Along these lines, Diffusion of Innovation Theory (Rogers, 1995, 2003) proposes that the adoption of new ideas, technologies and practices is influenced by social networks and it highlights the important role of key individuals and influence leaders in social networks as initiators and facilitators of innovation and change. Rogers describes diffusion as the process by which "an innovation is communicated through certain channels, over time, among the members of a social system (Rogers, 2003, pg.11). While Rogers originally developed the theory in his study of rural sociology and the adoption of innovations by farmers, his theory has been applied in many other fields. It is probably best known for its application in the fields of marketing, communication and medical sociology. In marketing it has been employed to study the production, distribution and consumption of goods and services, and particularly in the development of market research methods. In communications it has been used as a foundation to study social networks and interpersonal influence, and in medical sociology to study the norms and shared values that shape physicians clinical behavior, especially in the adoption of clinical guidelines. It has been widely used to study innovation in health care services (see for example Berwick, 2003; Grimshaw. et al.,2006; Stross, 1996). In reporting the results of a systematic review of health service innovations using diffusion theory Greenhalgh, Robert, MacFarlane, Bate, and Kyriakidou (2004) observe that a

successful innovation is likely to be one that is compatible with adopters' values and needs, is superior to the status quo, and perceived as simple to use and easily adopted (p. 596).

There is some disagreement in the literature regarding the scope of diffusion. Rogers (2003) viewed diffusion as both the active and passive spread of innovation. Others regard the active spread of innovation as dissemination, characterized as the "active and planned efforts to persuade target groups to adopt an innovation" (Greenhalgh et al., 2004, pg 582).

2.1.3. *Theories related to the organizational context.*

In their bluntest form, organizational approaches to behaviour change may take the form of coercive methods. These methods rely on pressure and control and may include budgetary measures, laws, regulations, licensing and accreditation. For example insurance payers exert control over health professionals' practice by defining which services will be compensated and defining those that will not. Laws restrict certain aspects of health care, for example abortion and other end of life issues. Licensing bodies have the legal power to dictate professional behaviour, for example, in British Columbia the Health Professions Act gives authority to the College of Registered Nurses to determine practice standards (e.g. set levels of performance and scope of practice) and the authority to require certain behaviours and to discipline or strike off registrants who do not comply. Grol (1997) suggests that the main value of coercive measures is in overcoming long-standing attitudes and habits and that "pressure from outside may be decisive in implementing and maintaining a desired change" (p. 420). So for example, in the past, health professionals seldom reported substance abuse by colleagues however; it is now required as a professional responsibility by most licensing bodies.

Beginning in the 1990's more sophisticated organizational theories and techniques of change began to be imported into health care from the business management literature. Many of these theories and approaches were packaged as quality improvement programs — a very attractive idea in an era of increasing costs, complexity, and an overall sense that the healthcare system could and should be more

efficient — however, they are nonetheless about implementing and managing change. In their literature review Dickson et al. (2012) identified several models and techniques in this category. Some of these include Business Process Re-engineering (BPR), Six Sigma, LEAN, and Total Quality Management (TQM) (sometimes also referred to as Continuous Quality Improvement or CQI). All of these approaches involve re-shaping organizational culture, streamlining products and processes, reducing waste, eliminating non-value-added work, and shortening cycle times (Snee, 2010). As business models, they heavily emphasize cost reduction and maximization of profit so it is little wonder then that these models have had limited impact in the healthcare setting, particularly in Canada, where the organizational "bottom line" is not a top of mind concern for health care practitioners. Mosadeghrad (2013) suggests that these models also fail because they tend to be undermined by the bureaucratic and departmentalized nature of healthcare with its hierarchical structure, issues of professional autonomy, and the overall difficulty of evaluating healthcare processes and outcomes.

Theories of organizational learning and knowledge management have also been applied to organizational change processes. Generally organizational learning theories apply to change created through training and organizational and human resources development. Knowledge management is associated with the uses of information technology and the development and application of intellectual property for innovation. For example Leonard-Barton (1995) describes how organizations innovate by integrating internal core capabilities with knowledge gained from external sources by an iterative process of experimenting and prototyping, involving users, and learning from the market.

While they have been the focus of a great deal of discussion and research in the business literature, the effectiveness of specific theories and methods of change in healthcare are not well studied. Grol et al. comment:

> Overall the lack of scientific work underpinning even some of the most popular models for change in health care is striking. This conclusion agrees with Greenhalgh and colleagues (2004), who strongly emphasized the need for more research on mechanisms that determine whether a specific innovation will be successful in a particular health care setting. (2007, p. 125)

2.2. Technology and socio-technical change

It is curious that while much has been written about the determinants, uses, and philosophy of technology the definition of technology has remained a vague term. Writing in 1976, Bunge observed “to some it means all techniques; to others, all applied sciences (including medicine and city planning); and to still others again, something else” (p154). In reading the current media it is apparent that the notion of what constitutes technology has changed little from Bunge’s observation in 1976, that is, there are many overlapping understandings.

The Oxford English Dictionary (OED, 2009) suggests two relevant meanings:

1. The study of the branch of knowledge dealing with the mechanical arts and applied sciences, and the application of such knowledge for practical purposes.(OED 4.a & b)
2. A particular practical or industrial art (OED 5.)

The Canadian Oxford Dictionary sums this up as “the study or use of the mechanical arts and applied sciences; the application of this to practical tasks in industry” (2004, p. 1489). This definition is surprising in an era when many would say we are surrounded by technology — few would limit its application to industry, and although it does make reference to “practical tasks” it fails to make the connection to a wider application of “technology as practice” (Boulding, 1969). Boulding advanced the idea of technology as “ways of doing something” or as Benner characterized it, “ways of knowing, being and doing” (1984, p. 56). Franklin (1999) insists that “technology is a system, it entails far more than its individual material components. Technology involves organization, procedures, symbols, new words, equations and, most of all, a mindset” (p. 3). Moreover, she points out that the notion of technology as formalized practice links it to social culture since “culture is a set of socially accepted practices and values” (p. 6). Thus, technologies are more than a sum of their parts, they are a combination of objects and artefacts and the knowledge and practices that go along with them (Suchman, 1987). The notion that technology is a socio-technical bundle rather than individual parts has lead to discussion about the nature of the relationship between technological artefacts, practices, and human users. For example May (2009) comments:

> There is no such thing as a technology. Instead there are complex and contingent matrices of knowledge, artefacts, and practices, and networks of human and non-human actors, engaged in reciprocal social relations through which each shapes the other (p. 146).

This broader view of technology will be used throughout this document.

2.3. Social Shaping of Technology

The area known as social shaping of technology (SST) research has developed a strong following as a method for understanding patterns of socio-technological change. Theories of social shaping of technology assert that there is a give and take – a reciprocal relationship — between society and technology so that technologies and the actors that use them are ultimately socially constructed or “shaped”.

SST has roots in an area of study known as industrial sociology, a field lead by Enid Mumford and others at the Tavistock Institute in the 1950s. Mumford's work examined office automation and established sociotechnical concepts and research methodologies and methods to be applied in the workplace. This approach included a strong case for work-centered participative design (Mumford & Banks, 1967). By the 1980s it was becoming an accepted fact that to understand the process of successful technological change in organizations it is necessary to take a closer look at the organization of work itself. As Suchman pointed out "the work world is situated, circumstantial and grounded in local practices and culture in a way that escapes the more rational modes of thought of system designers, and planners generally" (1987, p. 58). This was a new perspective in an era where technological determinism dominated. Williams and Edge (1996) comment that there are common threads that unite the various points of view in the “broad church of SST” and that one of the most important of these threads is the rejection of technological determinism. Technological determinism proposes that changes in society are mainly brought about by changes in tools and techniques. The SST perspective counters these claims by insisting that technological change is largely determined by choices: “SST studies show that technology does not develop according to an inner technical logic but is instead a social product, patterned by the conditions of its creation and use” (Williams and Edge, 1996, p. 866). They point out

that only some of these choices involve actual technical considerations, the majority are social choices which influence both the form and content of the technologies and their social implications "... different routes are available, potentially leading to different technological outcomes ... significantly, these choices could have differing implications for society and for particular social groups" (p. 866). The idea that technological systems have varying outcomes and the consequences for those using them is one of the key tenets of a field of study known as social informatics which will be discussed in detail below.

Many of the concepts and methods developed and explored by critical IS researchers at this time later provided the basis for the social construction of technology (SCOT) approach as described by Bijker, Hughes and Pinch (1989), and Bijker and Law (1992). SCOT focuses on the social construction process with particular emphasis on examining how relevant social groups play a role in defining and shaping technological artefacts (interpretive flexibility) and then effect the "closure" or stabilization of the artefact (Bijker, Hughes & Pinch, 1989). An understanding of the importance of context emerged at this point. Greenhalgh & Stones (2010) comment:

> ...context is not simply a given external milieu whose properties can be measured from afar and controlled for (positivist), nor is it merely a conceptual frame through which the technology is given meaning (interpretivist). Rather, context is a complex and emergent outcome of the interplay between social actors and their organisational and technological infrastructures, generated and regenerated when human actors use technologies in particular ways for particular purposes. (2010, p. 1286)

Actor-network theory (ANT) as elaborated by Callon (1986) and Latour (1987) concerns networks made up of both people and technologies and in particular focuses on what people and things become as a result of their position in a network, and the power that arises from the dynamic interactions of human and non-human actors. ANT proposes that networks are stabilized in a process of translation which consists of: problematisation (defining a problem for which a particular technology is a solution); interessement (getting others to accept this solution); enrolment (defining key roles and practices); and mobilisation (engaging others in the network) (Callon, 1986; Greenhalgh & Stones, 2010). ANT also adds the idea that non-human actors have agency in this

process, and further explains how closure occurs, that is, becomes taken for granted and therefore no longer questioned, a process referred to as "black boxing" (Meyer, 2006).

2.4. Social Informatics

Social informatics (SI) is a field of study that draws on the SST perspective to focus on “the design, uses, and consequences of information and communication technology (ICTs) that takes into account their interaction with institutional and cultural contexts” (Kling, Rosenbaum & Sawyer, 2005, p. 6). As Sawyer & Tapia (2004) note “social informatics is not a theory or a method. Social informatics provides a set of empirically grounded orienting principles that makes explicit particular elements of the socio-technical perspective regarding developing, deploying and using ICTs”(p. 97). As such it constitutes a research strategy rather than theory (Meyer, 2006) focusing on routine use rather than patterns of adoption and innovation at the systems level. As Orlikowski and Iacono point out “SCOT and ANT theorize on how new technologies come to be: Kling and Scacchi [referring to SI] theorize about how ICTs come to be used" (2001, p. 126).

Social informatics is based on some fundamental assumptions about the nature of ICTs and their interactions with the social system. Kling and his associates described a socio-technical system as “a web like arrangement of technological artefacts, people and the social norms, practices and roles” which accompany them (Kling, McKim, & King, 2003, p. 51). Further they insisted that the social context and the technical artefact are “highly intertwined”, that is, they co-constitute each other and must be studied together.

Social informatics views people as social actors who have “individual motivations, interests, practices, and values that influence how and why they use ICT.” Moreover, “people have individual agency that both shapes institutions and influences their adoption and use of ICT” (Kling, McKim, & King, 2003, p. 52). This is consistent with the notion that ICTs do not exist in a vacuum, they are situated in the social dynamic of their creation and use and as such are socially shaped (Orlikowski, 1993;

Suchman, 2002). Sawyer and Tyworth (2006) state that “social and historical context pervade every element of ICT from conceptualization to design to implementation and use” (p. 53).

Over time, social informatics researchers identified a number of insights from their empirical research. The first of these is that ICTs are not value neutral: their use creates winners and losers. ICT use in organizations is implemented for management reasons and may or may not benefit direct users. As a result, ICT systems may negatively impact users by limiting their access to information, imposing additional work, or initiating deskilling which ultimately leads to job loss. Thus they may have social repercussions on not just the quality of work life but the overall quality of life (Kling, Rosenbaum, & Sawyer, 2005)

Secondly they observed that ICT use leads to multiple and often paradoxical effects: both intended and unintended consequences (Kling, Rosenbaum, & Sawyer, 2005). A perplexing characteristic of ICT systems is that while they promise increases in performance, productivity and profits, they often fail to deliver, sometimes with catastrophic and/or unintended results (see for example http://www.telegraph.co.uk/technology/news/10520015/The-top-ten-technology-disasters-of-2013.html). A classic example is the notion of the ‘paperless office’. First proposed by Lancaster (1978) the notion of the paperless office forecasted that computerization would rapidly eliminate paper use. However, in spite of increasing computerization in Canada, paper (printing and writing paper, excluding newsprint) usage steadily increased each year, peaking in 2008 at an estimated 79kg per capita (FAO, 2013).

A third observation was that ICT use has moral and ethical aspects and these have social consequences (Eschenfelder, 2004; Brey, 2012). This finding is rooted in the observation that many system decisions are made without a clear understanding of the cumulative effect of their outcomes. These cumulative effects may ultimately affect not only value choices but areas such as privacy, confidentiality, accuracy, and security.

2.4.1. Socio-technical interaction networks

The central method of SI is the use of the socio-technical interaction network (STIN) model. The STIN approach has been defined by Scacchi (2005) as "a conceptual framework for identifying, organizing and comparatively analyzing patterns of social interaction, system development and the configuration of components that constitute an information system" (p. 2). The idea that the social and technological are not meaningfully separable is a common theme in both SCOT and ANT theory however as Meyer (2006) notes “the STIN approach extends SCOT and ANT by problematizing information technologies and making the association between STS concepts and IS research which is often not explicitly articulated as such in contemporary literature” (p. 39).

STIN mapping is accomplished by first identifying a relevant population of system interactors – here it is intended that the ecology of system interactors will be identified, not just core system users. The goal is to identify the roles and needs of all human actors. As Kling, McKim & King (2003) describe it; this is “akin to a stakeholder analysis” (p. 57). Using the example of an online communication forum, these stakeholders would extend to include funders and resource managers as well as forum users.

Next, core interactor groups – those who are at the centre of the information system are identified. This step takes the aggregate described in the first step and maps the different and often overlapping roles of subgroups. As in the previous example, if the context were a scholarly communication forum there may be authors, readers, reviewers, grant funders, administrators, etc. The goal at this stage would be to identify the core users.

Incentive structures are identified and examined. Here the question asked is: why would users want to participate? For example, why would authors wish to post their work in an online forum and why would readers wish to view it? Conversely, what are the disincentives for participation? Kling, McKim and King (2003) insist that this step is an equivalent of an examination of the ICT’s ‘business model’: its plan for sustainability.

Identifying excluded actors and undesired interactions is an often overlooked step in socio-technical research (Meyer, 2007). While SCOT emphasizes the role of

relevant groups in shaping technology, Meyer points out that the STIN approach includes the “irrelevant social groups, which are most often the silent or voiceless groups which will be impacted by technological changes, but are not in a position to shape the technology in any way” (p. 44). Likewise undesired interactions often receive little consideration but are significant demotivators for participation in ICT systems. Examples of undesired interactions could include exposure to increased monitoring or surveillance, “flaming” or harassment in communication forums, and general aggravation due to poorly designed or overly bureaucratic systems.

Finally, resource flows are identified and mapped. Kling, McKim and King refer to this as “following the money” to understand how resources flow through a network (p. 58, 2003). However, they note that monetary resources aside there are other necessities to make a system work. These may include things like the work required to make a system useful (articulation work), content control and governance structures, and infrastructure such as user technical support, equipment, and network capabilities.

The STIN model was intended to be a practical tool focusing on routine use at the individual level and had a twofold agenda. The first is a research agenda that includes normative, analytical and critical orientations. The normative research agenda has the goal of influencing practice by demonstrating alternatives for those who design, implement, use or make policy about ICTs. The analytical orientation are studies that develop theories about ICT use, and the critical orientation refers to research that examines ICTs from multiple perspectives including work that examines "disjunctions between popular and professional claims about the social values and uses of ICTs" (Kling, Rosenbaum & Sawyer, 2005).

The second part of the SI agenda is dissemination. Kling and his colleagues envisioned an agenda for communicating SI to a wider audience, particularly ICT professionals; researchers and teachers in various disciplines notably schools of business, computer science and engineering; and policy makers involved in funding or purchasing or implementing ICT systems (Kling, Rosenbaum & Sawyer, 2005).

Published applications of STIN modelling include the mapping of online communication forums (Kling, McKim & King, 2003), scholarly publishing (Meyer & Kling,

2000) and corporate web information systems (Eschenfelder & Chase, 2002). Meyer (2007) used STIN modelling to study the adoption and use of digital photography by marine mammal researchers. In these examples STIN modelling was used as "a post-hoc analytic tool" however, Kling, McKim and King (2003) insisted it could be used in the design and implementation stages of ICT projects to facilitate change and head off system failures. Creanor & Walker commented that value of SI is in:

> taking a wider view of participants as social actors who have multiple roles and relationships which can affect behaviour ... this reconception of the user as a social actor reflects a view that the technology is not at the centre of the 'user's' world but is one thing among many human and non-human elements with which they interact in the process of accomplishing something. (Creanor & Walker, 2010, p 522)

Rob Kling's unexpected death in 2003 limited the further development of SI's agenda. However, on a positive note, its second goal of dissemination continues to have a strong impact in Information and Computer Science programs, particularly in Europe.

SST brought a focus on "the user" of technological systems. Over the years there have been many conceptualizations of the user. The notion of actors having agency is a central feature of the SST approaches: people are viewed as social actors (rather than merely technology users) with individual motivations, interests, practices and values that influence how and why they use ICT (Lamb & Kling, 2003). While they acknowledge that social actors may not have control over the technological artefacts they are given to use, Lamb and Kling insist that social actors have agency in how they use (or not use) the technological artefact. It is this focus on the work of individual actors in complex socio-technical environments that I wish to bring to this study. In the following section I will describe how this work is conceptualized by NPT.

2.5. Normalization Process Theory

As social informatics insisted, introducing complex interventions in socio-technical organizations is not a simple process. Unfortunately Kling's death, and the scattered nature of SI research, prevented the advancement of SI to fully explain the

social component of socio-technical change in complex organizational environments such as health care settings. These complex interventions are defined by May et al. (2007) as "any deliberately initiated attempt to introduce new, or modify existing patterns of collective action in health care or some other formal organization setting" (p. 3). Complex interventions can take several forms — those that are directed at (human) actors to change behaviour and outcomes, particularly professional practice or roles, or those aimed at objects, for example medical devices or health information systems, with the goal to change expertise and actions. Still other interventions may be directed at contexts with the aim of changing procedures to achieve goals. May (2006) comments that “complexity arises when the interventions engage simultaneously with multiple actors, objects and contexts” (p. 3). Healthcare is a complex socio-technical environment with many complementary and overlapping organizational and professional roles. The introduction of a new technology which changes these relationships adds yet another layer of complexity. As Pope et al. (2013) note ”technological interventions do not slip seamlessly into established practice but instead they meet with resistance and rejection because they threaten established professional identities and power relations” (p. 2). For example, the introduction of automated medication delivery systems on hospital wards placed a new technology in hospital units that affected the professional practice, roles, expertise, and actions of both pharmacists and registered nurses, and ultimately patients (for example see Novek, 2002).

NPT has been proposed as a way of facilitating these kinds of complex interventions. May et al. (2009) state that "NPT provides a set of sociological tools to understand and explain the social process through which new or modified practices of thinking, enacting, and organizing work are operationalized in health care and other institutional settings" (p. 2). Drawing from social informatics and the notion of social shaping of technology it acknowledges that, while socio-technological change is often imposed in health care organizations, it is the work of human actors — staff, clinicians and patients — who can stabilize or destabilize a socio-technical system. When they cannot, do not, or will not buy in, problems of workability and integration arise.

NPT proposes that there is specific work that defines and organizes complex interventions by which they become routinely embedded in practice. In this conception, work is defined as "purposive social action that involves the investment of personal and

group resource to achieve goals" (May & Finch, 2009, p. 539). There is a specific focus at the micro level on the work of individuals — "we must look at what people actually do and how they work" (May et al. 2009, p. 2). Thus one of the goals of NPT is to understand the nature and function of the work: who does it, and how does it get done and also, how is this work understood by those involved? NPT proposes there are four generative mechanisms that operationalize the work: coherence; cognitive participation; collective action; and reflexive monitoring (May and Finch, 2009, p. 540). The following section will elaborate these constructs and a summary of NPT construct definitions can be found in Appendix A.

2.5.1. Coherence.

In NPT the construct of coherence is defined as “The sense-making work that people do individually and collectively when they are faced with the problem of operationalizing some set of practices” (May et al., 2010). It includes the sub-constructs of differentiation – understanding how a set of practices and/or artefacts are different from each other; communal specification – a shared understanding of the aims objectives and benefits of a set of practices; individual specification – how individuals understand their specific tasks and responsibilities around a set of practices; and internalization – how people understand the value, benefits and importance of a set of practices (May & Finch, 2009; May et al., 2010).

The concept of coherence addresses the struggle of users to make sense of a new system as a coherent practice relevant to their work. On an individual level, when faced with the introduction of a new socio-technical system, workers invariably ask themselves “what is the nature of this change, why is it being implemented, and how does this affect me and my work?” There is a struggle to understand how the new system differs from the old, to understand new aims and objectives, their own role, how it changes their relationship with coworkers, and the value and benefits of the new set of practices. As social informatics pointed out, it is not surprising that workers are concerned about technological changes to their work. When systems are created a “technological script” is assembled by the designers which may or may not accurately reflect the patterns of use and daily activities of the users. Designers often base system design on job descriptions, work documents, and expected outcomes all the while

ignoring the tacit knowledge and articulation work that actually goes into work performance. May (2009) suggests that these scripts can create "contingencies that can radically change the distribution of work and the knowledge required to conduct it"...often unanticipated by designers and managers, and even by professionals and patients" (p. 147). Similarly, Nicolini notes that:

> When put to work, the concrete anticipations and restrictions of future patterns of use embodied in the technological artefact interact in complex ways with the existing work practices of the users the result is a process of negotiation between the innovation and the work activity. The outcome of such negotiation determines, on the one hand, how the innovation is used 'in practice'; at the same time it produces some kind of change in the work practice, usually along lines which reflect (to some extent) the desires and intentions of the designers and their sponsor. (2006, p. 2757)

She continues: "...when misalignments between technological scripts and daily practices occur ...it is not unusual that the technology is rejected, ostracized, or more often, silently ignored." Thus the coherence factor is a key aspect in the workability of new practices. NPT proposes that the coherence factor will be high if individuals understand how a new practice differs from an existing practice and have a clear understanding of their new roles and responsibilities; and if workgroups have an understanding of the collective objectives and benefits of a new practice.

2.5.2. Cognitive participation.

The second construct, cognitive participation, is defined as "the relational work that people do to build and sustain a community of practice around a new technology or complex intervention" (May et al., 2010), and their commitment to making the system work. Cognitive participation is about enrollment and engagement. It contains the sub constructs of initiation – the willingness of key participants to drive the implementation forward; enrollment – which could be thought of as participant 'buy in'; legitimation – the sense that participants have that it is right for them to be involved in the new practice; and activation – participants collectively define the actions and procedures needed to sustain a practice and to stay involved (May et al. 2010). The construct addresses the steps participants take to enact the social organization necessary to make a complex intervention successful (or not). When new practices are introduced participants make a

conscious (or perhaps unconscious) decision about whether or not they see it as a good idea. Most likely they ask themselves "does this new practice fit with my perceived role, will it improve my role or position, is it right for me to be involved, and if so, what do I need to do?" Importantly this construct insists that this must be collective action, that is, communal engagement will be necessary to make the new practice work: there must be a willingness in the work group to invest in the new practice.

The notion that participants, both individually and collectively must buy in to a new practice for it to be successful reflects the ideas put forward by the motivational and social theories of the 1990s, that is, the importance of readiness and intention to change and the importance of social context in initiating and sustaining change. It also echoes the SI perspective that the social dynamics of technological change are pervasive.

2.5.3. Collective action.

The construct of collective action could be described as "enacting work." It is defined by May et al. (2009) as "the operational work that people do to enact a complex intervention" (p. 544). This is perhaps the most complex construct of the theory. It includes the sub constructs of interactional workability; relational integration; skill set workability; and contextual integration.

Interactional workability concerns the affordances of the new practice — does the new implementation make people's work easier or more difficult by facilitating or hindering their interactions with others? Paradoxically, there are many examples in the literature where new systems actually made the work more confusing, onerous, and error-prone than the processes they replaced (see for example Greenhalgh, Stones & Swinglehurst, 2014).

The interactional workability of health care services can have significant impact on patients and poorly designed systems may contribute to non-compliance or withdrawal from treatment. The phenomenon, known as the "burden of treatment", refers to a situation where interaction with the healthcare system, new health care technologies, and the requirements of treatment regimens can overwhelm patients who are already vulnerable and less able to cope with changes in their lives (see for example, Gallacher et al., 2011; Gallacher et al., 2013).

Relational integration pertains to how well the new implementation fits with existing relationships: does it promote trust and accountability within groups or create divisions and mistrust? Here I see a link to the SI insight that ICTs are not value neutral, they create winners and losers. Implementations that de-skill or alter existing patterns of trust and accountability are likely to be resisted by those involved.

Skill set workability concerns the degree to which the new initiative fits with existing working practices, skill sets, and perceived job role. Are workers being asked to take on new job roles for which they feel unsuited, untrained, or which they consider to be inappropriate to their professional roles and expectations? Conversely, are they being asked to delegate functions to other health care providers whom they feel are not qualified?

Finally, contextual integration refers to the degree to which the implementation aligns with the overall goals and capacities of the organization. Is the new practice a good fit with organizational goals and aspirations and does the organization have the financial and technical capacity (and will) to support the new practice (Finch, 2012)?

It is easy to see that any one of the sub-constructs of collective action could easily be a “deal breaker” when it comes to determining the success or failure of new implementations. Work groups generally have patterns of role expectations and interactions that have evolved over time. If a new implementation changes those interaction patterns in such a way that it is perceived as making one’s work more difficult, or adds more work to an existing work load, participants will be less receptive. Similarly a disruption of a work group’s existing systems of accountability and trust may lead to decreased willingness to participate. This is particularly true in the health care system where there is a mix of overlapping professional roles and responsibilities, legal, and ethical concerns. For example if patients are self monitoring blood pressure, or other biometric parameters, are clinicians willing to trust that data in their decision making?

Skill set workability concerns expectations around the division of labour. These can be particularly contentious when a new implementation changes workloads, roles, or tasks. For example the implementation of electronic health records often requires

physicians to undertake data entry tasks formerly done by clerical staff. In other situations nurses may be required to assume tasks formerly done by physicians or medical technicians, and patients (or their care givers) may be asked to take on self care tasks which they may, or may not, feel capable or willing to do. Both individuals and workgroups may question the acceptability of these role changes, asking themselves "is this really part of my job, is this something I'm qualified to do, does it feel right for me to do this?"

Organizational support is a key factor in contextual integration. While issues of funding and managing costs are a factor, May (2009) notes that successful integration:

> refers to the ways that new systems of practice are linked organizationally to other already existing forms of work in an organization – perhaps as responsibility for a procedure moves from one professional group to another or to modify existing practices to make new ones possible, minimising the disruption and risk associated with change, and how new resources are obtained and used in practice. (p. 155)

When a new practice is implemented it frequently requires additional funding, training, equipment, infrastructure and ongoing support for the practice to be sustained. Finch et al (2007) observed in their study of the implementation of a teledermatology service in the United Kingdom that "if equipment was simply 'parachuted' into an existing clinical context without adequate and ongoing support, the chances for successful introduction and integration of the teledermatology system into practice were severely compromised" (p. 524). Thus management sponsorship and allocation of resources is an important component in the enactment of a new practice.

2.5.4. Reflexive monitoring.

The final construct, reflexive monitoring, is "the appraisal work that people do to assess and understand the ways that a new set of practices affect them and others around them" (May et al., 2010). It includes ongoing mechanisms for monitoring and appraising the intervention and "may involve judgements about the utility and effectiveness of a new practice, and these are made with reference to socially patterned and institutionally shared beliefs" (May & Finch, 2009, p. 545). Sub constructs of

reflexive monitoring include systematization; communal appraisal; individual appraisal, and reconfiguration.

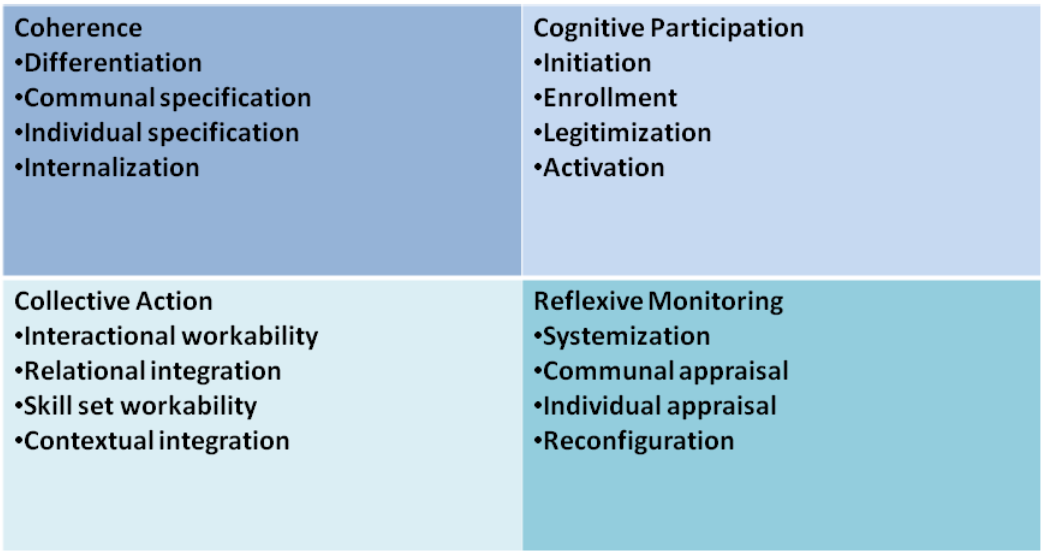
Systematization is the formal evaluation of new practices and it involves gathering information in a variety of ways. It can involve quantitative methods such as systematic reviews; clinical trials; process evaluations; and health technology assessments (see for example Lehoux, 2006), or it may incorporate qualitative methods such as patient satisfaction questionnaires, focus groups and employee engagement surveys.

Communal appraisal occurs informally in every day settings when individuals ask coworkers “what do you think about the new [x]?” Or it can take the form of individual appraisal when participants ask themselves “is this new practice working for me – is it making my job easier or more difficult?”

When individual or communal appraisal determines that a new practice is not working, reconfiguration attempts (workarounds) may be made by individuals or groups. Workarounds can take a variety of forms. These can include organizationally sanctioned efforts to modify or redefine the new practice, or workgroup level shortcuts to improve workability. However, in the face of organizational indifference to workability issues reconfiguration attempts may range from passive resistance to outright rejection or refusal to engage with the new practice (see for example Greenhalgh, Stones, and Swinglehurst, 2014).

The four NPT constructs and 16 sub-constructs are illustrated in the figure below. A detailed chart of the NPT construct definitions can be found in Appendix A.

Figure 1 NPT Constructs and Sub-constructs.



2.6. Normalization

NPT has yet to specify how normalization can be defined and measured. As Finch et al. comment:

> Normalisation (sic) is highly context dependent, relating to the practice itself, the environment in which it is operating, and the different groups of individuals that relate to it. As such NPT does not provide any particular definition of normalisation for the purpose of measurement as an outcome variable. (2012, p. 13)

Calling for further work in this area, Finch et al. (2012) propose that normalization outcomes that could be considered indicative of normalization include level of use; increasing use over time; the amount of shift from one practice to another; the disappearance of a previous practice; the reported acceptability of a practice; or measures of quality work stemming from use of the practice.

2.7. Applications of NPT

Since its introduction NPT has begun to be widely applied to healthcare practices and processes (McEvoy, Ballini, Maltoni, Mair, & MacFarlane, 2014). Specific examples include telehealth service delivery (Murray et al., 2011); clinical decision support technologies (Elwyn, Legare, van der Weijden, Edwards, & May, 2008; Pope et al., 2013); health services re-organization (Forster, Newton, McLachlan, & Willis, 2011; May, Mair, Dowrick, & Finch, 2007); nutritional services (Bamford, Heaven, May & Moynihan, 2012); and chronic disease management (Gallacher, May, Montori, & Mair, 2011; Gallacher, et al., 2013). Its utility has also been recognized in other contexts as varied as the analysis of wine-making practices in South Africa, the integration of Korean pop music in Californian youth culture; understanding launch procedures for Tomahawk cruise missiles (May 2013a); the development of winter sports equipment (Hauge & Power, 2012); smoking cessation programming (Procter-Scherdtel & Collins, 2013); and information services in business settings (Sooklal, Papadopoulos & Ojiako, 2011).

2.8. Conclusion

Successfully introducing complex interventions in healthcare is a difficult task. This chapter summarized a sampling of the many theories of change, beginning with a discussion of theories and methods that have been proposed to change professional practice and behaviour, and to facilitate change in healthcare organizations. In the second section I moved the discussion to key aspects of the SST approach, in particular social informatics, and how these perspectives have informed the development of NPT. The final section discussed the theoretical perspectives of NPT and its conceptual framework in detail, concluding with examples of how NPT has been applied to date.

The next chapter will outline the research plan to study a complex intervention through the lens of NPT.

3. Research Methodology and Design

3.1. Introduction and Overview

In this chapter I will describe the methodology and methods used to examine the research problem and address the research questions outlined in Chapter 1. I will begin with a discussion of the qualitative approach to research and my rationale for the choice of a case study methodology. I follow this with details of my field work: a description of how I gained entry to the field site, my data gathering approach and data analysis plan. A detailed description of "the case" will be provided in Chapter 4.

3.2. Research Design

This study examines the work and behaviours of human agents in the context of a complex intervention that took place in a large organization. Human behaviour is complex and profoundly influenced by beliefs, experience and perceptions. Further, the organizational workplace imposes unique social structures and norms that often clash with technological change. Given this complex environment, it seemed to me that the best approach would be to try to understand the perceptions of those undergoing the change and therefore I was drawn to qualitative inquiry and in particular, the case study method. Qualitative research methods incorporate a wide variety of approaches and a complete discussion is beyond the scope of this study instead, I will narrow the discussion to the hallmarks of the qualitative approach that are applicable to case study research.

3.2.1. *Qualitative research approaches.*

What is the qualitative approach to research? As explained by Denzin and Lincoln (2000) "... qualitative researchers study things in their natural settings,

attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them" (p. 3). Attempting to understand the "emic" perspective – the perspective of the people being studied – is one of the hallmarks of the qualitative tradition. Some authors have described this focus on social complexity as a "holistic" or "naturalistic" approach (Cresswell, 1998; Rossman & Rallis, 2003) and emphasize that the data is collected in the "real world" rather than in a laboratory or manipulated setting. Snape and Spencer (2012) observe " ...there is a fairly wide consensus that qualitative research is a naturalistic, interpretative approach concerned with understanding the meanings which people attach to phenomena (actions, decisions, beliefs, values etc.) within their social worlds" (p. 3). As a counterpoint, Strauss and Corbin (1998) define qualitative research for what it is not: "...any type of research that produces findings not arrived at by statistical procedures or other means of quantification" (p. 11).

Other authors point to characteristic methods as defining features of the qualitative approach (see for example Bryman, 1988; Denzin and Lincoln, 2000; Miles and Huberman, 1994). Some of these hallmarks include: the flexible nature of research design and data collection; the volume and richness of qualitative data; the distinctive approaches to analysis and interpretation; the kind of outputs that derive from qualitative research; and the emic research perspective and the focus on the participant's frames of reference discussed above (Snape & Spencer, 2012).

Flexible data collection methods that allow the researcher to engage in the perspectives of the research participants include in-depth interviewing, group discussions, narratives, observational methods, and the analysis of documentary evidence. The goal of these methods is to collect and assemble, as Ryle (1968) described it, a 'thick description ... a multi-layered sandwich" that encompasses the participant's total experience. Such detailed descriptions naturally generate large data sets and the problem of qualitative data analysis is approached somewhat differently according to the method of data collection. A common approach is the systematic development of categories and coding schemes. Cresswell (1998) describes a "data analysis spiral" (p. 143) in which the researcher begins with immersion in the data, making notes and initial codes from emergent themes (rather than imposing pre-developed categories), and then moving on to more detailed description, elaboration of themes, and classification. Several authors have described this as a "winnowing"

process (Creswell, 1998; Guest, MacQueen, & Namey, 2012; Seidman, 2006). In a related strategy, Strauss and Corbin (2008) describe an iterative process:

> Analysis is a process of generating, developing and verifying concepts – a process that builds over time and with the acquisition of data. One derives concepts from the first pieces of data. The same concepts are compared for similarities and differences against the next set of data – either expanding concepts by adding new properties and dimensions, or if there are new ideas in the data, adding new concept to the list of concepts. Or there is still a third option of revising previous concepts if after looking at the new data it appears that another term would be more suitable. (p. 57)

In this iterative way the data can ultimately be interpreted and sense making and explanation building can occur. In the following section I will explain how I applied these methods.

3.2.2. *Case study research approach.*

In the qualitative tradition, case study research has many advantages that make it an appropriate strategy for answering the research questions outlined in Chapter 1. Telehealth projects operate within a bounded system, that is, one that is defined by time, place, activity and context (Yin, 2003). Creswell (1998) defines a case study as "an exploration of a bounded system or a case (or multiple cases) over time through detailed, in depth, data collection involving multiple sources of information rich in context" (p. 61). In particular, Yin (2003) notes that case study design should be considered when the research questions are focused on a phenomenon where the contextual conditions are pertinent to the study – a feature relevant to the study at hand. Murray et al. (2011) comment that:

> Case study methods are appropriate for studying complex systems which are in a state of flux and for exploring how particular outcomes occurred, rather than simply describing what happened. Case study methods are distinguished by their in-depth focus on a relatively small number of units or 'cases' and benefit from prior development of theoretical propositions to guide data collection and analysis. (p. 3)

Data collection methods used in case study research can draw on a wide variety of information sources and Yin (2003) describes six of these: documentation; archival

records, interviews; direct observations; participant observations; and physical artefacts (p. 83). In fact Yin insists that one of the strengths of the case study method is the opportunity to use multiple sources of information in a process of triangulation, adding greatly to the thick description of the qualitative tradition.

A common misconception is that case study research lacks rigor. This idea has come about, in part, because the term “case study” is used differently in various fields and case studies are often created for purposes other than research. In case study teaching, for example, educational case studies are designed for pedagogical purposes. They are prepared in such a way that they can be used to promote discussion or illustrate principles and while they may incorporate facts they may also be more “story” than accurate description. In medicine, social work, and law, case studies are often used to describe exemplary or unique situations and while they do contain accurate descriptions of data and events they are intended to serve a documentary rather than an analytic function. With regard to research case studies Lewis (2012) observes that:

> The primary defining features of a case study are that it draws in multiple perspectives (whether through single or multiple data collection methods) and is rooted in a specific context which is seen as critical to understanding the research phenomena. (p. 76)

Lewis (2012) goes on to say that case studies “are used where no single perspective can provide a full account or explanation of the research issue, and where understanding needs to be holistic, comprehensive and contextualised” (p. 52). Research case studies seek to gather faithful and accurate descriptions of data and events with the intention to analyse or generalize.

This study was conducted using an instrumental case study. Baxter and Jack (2008) indicate that an instrumental case study is "used to accomplish something other than understanding a particular situation: it provides insight into an issue or helps to refine a theory” (p. 549). Further, Stake (2000) notes that in an instrumental case study “the case is of secondary interest; it plays a supportive role, facilitating our understanding of something else" (p. 437). By using qualitative methods an instrumental case study attempts to develop a thick description of a particular site, individual, group or occupation with the goal of reconstructing experience. Since the case is indexed to

theory or a conceptual framework (the instrument), it provides the opportunity for theory testing and comparison (Stake, 2000). While this study uses a single case design, the instrument used, the conceptual framework of NPT, has been derived from the analysis of multiple case studies of telehealth implementations and has been field tested and validated (May & Finch, 2009; May et al., 2011).

3.3. Data Gathering

3.3.1. *Preliminary work.*

The field site for this project was the Workplace Health Call Centre (WHCC), a part of the workplace health department of a large suburban health authority. This health authority serves a population of 1.6 million people over a large geographic area and employs over 26,000 staff and 2,500 physicians. Facilities include 12 acute care hospitals, 7,760 residential care beds, mental health services, public health, and home and community care services. At the time the call centre was implemented the workplace health department employed 11 occupational health nurses (OHNs) to provide services to an employee population of approximately 26,000 employees. Shortly after the study period the WHCC expanded to service the entire cohort of healthcare workers in British Columbia – a total of 110,000 employees.

Gaining entry to a research site is perhaps one of the biggest hurdles academic researchers must overcome. I was fortunate that through my professional contacts I had become aware of the Workplace Health Call Centre project and the changes that were happening in this department. I initially contacted the manager of the WHCC (Managing Consultant, Health and Wellness) to find out if she would be interested in participating in the project. We discussed an outline of the aims of the study and how it might be carried out. She was enthusiastic and her manager (Executive Director Workplace Health) also gave whole-hearted support and agreed to be the organizational study sponsor. I then developed a formal research proposal that was approved by both Workplace Health management and my doctoral supervisor.

3.3.2. *Ethical approval.*

Ethical approval for the study was sought from the Office of Research Ethics, Simon Fraser University Research and the Health Authority Ethics Board. Both Boards agreed that the study presented a low probability of harm to participants resulting from a breach of confidentiality and that the potential magnitude of that risk was also low. No other risks (physical, psychological, financial, health, legal) were identified therefore the application was designated as low risk and approved quickly.

3.3.3. *Study population: sampling and recruitment.*

Purposive sampling was used in this study, a method which is typical of the case study methodology. Silverman (2006) states that "purposive sampling allows us to choose a case because it illustrates some feature or process in which we are interested" (p. 306). The development and implementation of the WHCC was a good example of a complex intervention representing socio-technical change at the organizational level. Therefore, the criterion for selection of participants was direct involvement with the WHCC project. The potential study group totaled 14 individuals: 2 management staff members, 11 OHNs (although two were on leave during the study) and one member of Information Technology Services who is assigned responsibility for the electronic health record system.

Potential research participants were initially contacted by means of a handout (see Appendix B) describing the study and inviting them to participate. Interested individuals contacted the researcher directly and arrangements were made to meet them at a location that would be most convenient to them, preferably outside of the workplace, to explain the study and consent process, obtain consent and conduct the interview.

While the study was designed to ensure subject confidentiality as much as possible, Workplace Health is a relatively small and close knit working group whose membership is a matter of public record. Participants were informed of this risk in the consent process and they had the right to refuse to participate or withdraw from the study at any time. All individuals contacted consented to participate in the study.

3.3.4. *Interviewing methodology.*

One of the methods of data gathering used in this study was semi-structured interviews. This approach was chosen because it allows some flexibility to explore comments and topics that emerge during the course of the interview while using a framework of pre-determined questions that ensure that the topics and issues relevant to the study will be covered in each session. Unlike a structured interview in which the interviewer reads aloud scripted, closed-ended questions that offer the participants a limited range of responses, semi-structured interviews use open-ended questions that allow and encourage participants to explain and expand on their responses and express what they feel is relevant and important (Bryman, 2001).

The questions were designed using the person-centered interview approach as described by Levy and Hollan (1998) and Meyer (2007). This approach differentiates between participants as informants and participants as respondents, and ideally, "person-centered interviewing moves back and forth between the informant and respondent modes" (Levy & Hollan, 1998, p336). Meyer (2007) comments: "it is important to understand the difference between an informant and a respondent and to direct interviews skilfully toward eliciting the types of information available from both of these perspectives" (p. 121). Using the participant as an informant encourages them to answer as a witness and tends to result in the types of answers that reflect local cultural expectations of how things are meant to be regardless of how they are in reality. An example of such a question might be "to what extent does the Workplace Health Call Centre meet the needs of clients?" On the other hand questions such as "from your perspective, how did the WHCC come about?" treat the participant as a respondent and are more likely to result in answers that reflect a personal perspective that may illustrate differences from the accepted cultural norm. Meyer notes this approach "helps to uncover the tensions between social and cultural expectations and individual experience of events" (2007, p. 121). Moreover, Yin (2003) notes that key informants "are often critical to the success of a case study. Such persons not only provide the investigator with insights into a matter but also can suggest sources of corroboratory or contrary evidence" (p. 90).

3.3.5. *Interview method.*

The interview script used in this study consisted of open-ended questions. A copy of the interview script can be found in Appendix D. Question development was informed by the four general NPT constructs (Coherence, Cognitive Participation, Collective Action, and Reflexive Monitoring), and the technique of person-centred interviewing as described by Levy and Hollan (1998) described above.

The interviews were generally between 45 minutes to one hour in length. A total of 11 participants were interviewed initially and 6 follow-up interviews were conducted. In addition, two key informants were contacted many times over a period of one year for fact checking and updates. Participants contacted for follow up interviews were asked to verbally reconfirm their consent to continue to participate in the study before each interview or follow up contact.

The Managing Consultant was very generous in providing documentation concerning the creation and development of the WHCC including statistics and follow up reports. I was also given a tour of the WHCC and this gave me an opportunity to observe the general operation of the department, the equipment and workstations used by the participants, and the general working atmosphere. In all I made 8 visits to the department and, and mentioned above, conducted many informal follow-ups with key informants by telephone and email.

3.3.6. *Data gathering process and procedures.*

The interviews were digitally recorded and transcribed by a professional transcriptionist. Participants had the opportunity to review the transcripts and clarify, revise or delete any portions they wished. Before they were erased I reviewed and compared the recordings with the transcripts to make sure pauses, silences, and stray comments were accounted for. Once the transcriptions of the digital recordings were approved by the participants the recordings were securely erased to eliminate any possibility of voice identification. Further, transcribed interviews were assigned a unique study number and then the participant's name and other identifying information were removed. Occasionally, non-study individuals were identified by name during the course of the interviews and they were also assigned a code name for anonymity.

Details of the case study were assembled and clarified during interviews with key informants, and analysis of documents provided by the Managing Consultant. The final case study as described in Chapter 4 was reviewed by key informants for accuracy.

3.4. Approach to Data Analysis

Qualitative data analysis can be a daunting task due to the large data sets generated. I decided to use the "framework" method as described by Ritchie & Spencer (1994) and Ritchie, Spencer & O'Connor (2012). This method involves processing the data in several stages: familiarisation, identification of a thematic framework, indexing, and interpretation.

The first phase of the framework method involves familiarization with the data. I began by reading over each interview transcript several times. I found this useful since when one is actually conducting an interview there are many distractions. For example, I was always mindful of time since some of the participants met me on their lunch breaks. While I wanted to keep to the interview script for consistency I didn't want to miss following up on comments or probing for depth so sometimes the interviews seemed rushed. By reading over the transcripts I found some nuances that I had initially missed and some comments that I should have followed up at the time but didn't. I noted these for follow up with the participant. I also spent time re-reading the organizational documents and my observational notes.

The next phase of the method involves identifying recurring themes and concepts and creating the thematic framework. Ritchie, Spencer & O'Connor (2012) describe this as a process of discerning the main themes and related sub-topics. They note "these may be of a substantive nature – such as attitudes, behaviours, motivations or views – or of a more methodological ilk, such as the general atmosphere of an interview or the ease or difficulty of exploring particular subjects" (p. 221). On the second or third reading of the transcripts I began to highlight themes and create in vivo codes for them. The term in vivo comes from the Latin "in that which is alive" and "refers to a word or short phrase from the actual language found in the qualitative data record ... it has also been labeled literal coding and verbatim coding" (Saldaña, 2012, p. 74). Strauss (1987)

insisted that in vivo codes are meant to “capture behaviours or processes which will explain to the analyst how the basic problem or the actors is resolved or processed (p. 33). Charmaz (2006) comments that in vivo codes “help us to preserve participants’ meanings of their views and actions in the coding itself” (p. 55). Therefore, I made every effort to create authentic codes from the participants’ own words rather than forcing my own interpretation on the data. In addition to the interview transcripts I used in vivo thematic analysis on the documents pertaining to the call centre, and the observational field notes made during the interviews and my visits to the department.

The third phase of the framework method involves creating or applying a conceptual framework or index to the themes or issues emerging from the thematic analysis. As Ritchie, Spence and O’Connor point out “indexing involves reading each phrase, sentence and paragraph in fine detail and asking “what is this about” in order to determine which part or parts of the index apply” (2012, p. 224). It is essentially what librarians do when they index an item in a bibliographic record. Due to my graduate study in Library and Information Science, this was something I felt comfortable doing. For the purposes of this study I used the NPT constructs (coherence, cognitive participation, collective action and reflexive monitoring) and their 16 sub-constructs as the conceptual framework to create a thematic index. I felt it was important to use the in vivo codes to inform the selection of NPT constructs in order to avoid simply forcing the data into the NPT framework (MacFarlane & O’Reilly-de Brun, 2011). Similar to the experience of MacFarlane and O’Reilly-de Brun I found that some of the NPT codes tended to be somewhat vague and overlapping. To deal with this uncertainty I used a process of double coding as described by Krefting (1991), that is, I re-coded the complete data set about a month after the initial coding and re-examined items that did not agree with the original code.

In the final phase of the method the thematic index is used to summarize and analyze the data. I had originally planned to use data management software, such as NVivo™ to organize and categorize the data, and I spent some time researching its capabilities. However, in the end I found that the data set was a manageable size and I felt more comfortable working on paper. The actual process of analysis will be described in greater detail in Chapter 5.

In the next chapter I will elaborate on the research site and provide a detailed description of the case – the evolution of the Workplace Health Call Centre from its beginning to provincial mandate. I will begin with some background information on the professional practice of occupational health nurses and then move on to a general description of the site. Next I will describe the evolution of the WHCC, how the OHNs in this health authority fundamentally changed the way they work and how they successfully implemented a complex socio-technical system.

4. Case Study

In this chapter I will attempt to provide a comprehensive description of the development and operation of the Workplace Health Call Centre (WHCC) – "the case." The call centre project was first conceived in 2008 and began operation in 2009. My description of the case covers the period from 2008 to the end of 2012 at which point the service expanded from one health authority to cover the entire province. My involvement with the field site began in June 2012 and continued to the end of the study period in May 2013.

Since occupational health nursing is a unique nursing specialty, I begin this chapter by providing a brief overview of its scope and practice. The remainder of the chapter describes the development and implementation of the WHCC.

4.1. Background: Occupational Health Nursing

Occupational health nursing (OHN) is a little known and highly specialized nursing practice in Canada with perhaps as few as 150 OHNs working in all of British Columbia. Occupational health nursing has a focus on the prevention of illness and injury in the workplace, so nurses in this specialty typically engage in health promotion, disability management, and occupational health and safety administration activities. They can be found in a wide variety of settings from heavy industry and resource-based settings to corporate office environments. Unlike other types of nursing in which the nurse's practice is determined by the specialty, it is the particular work environment that determines the practice of each OHN. For example, a critical care nurse in one hospital performs relatively the same duties as a critical care nurse in another however, an OHN working in an office setting will have a much different practice from an OHN working in heavy industry or a health care environment since the occupational stresses, hazards and illnesses of the work environment differ in each setting.

Educationally, nurses working in occupational health have a minimum of a diploma in nursing and professional licensure as a Registered Nurse in the province they practice in. Many also have baccalaureate or master's degrees in nursing and/or other fields, and additional course work in the specialty. The Canadian Nurses' Association administers a national certification examination process and successful candidates are entitled to use the designation Certified Occupational Health Nurse (Canada) or COHN(C). Although national certification is not a requirement for practice it is regarded as the "gold standard" of OHN qualifications – both in Canada and the United States.

Many OHNs work in a single nurse practice environment and some are self employed as consultants, therefore they need to have excellent skills – clinical knowledge and reasoning abilities, communication skills, and a wide range of nursing experience. OHNs also require a measure of business "savvy." OHNs in business and industry are often the only health professional in the workplace, moreover they find themselves in a somewhat unique position for registered nurses, that is, they must take a "bottom line" approach to service delivery, be able to justify their services in financial terms, and show how they contribute to the overall success of the organization. In this way OHNs require an entrepreneurial attitude and the ability to focus on the "big picture" – attributes which are evident in this case study.

4.2. Study Context – Workplace Health Services

This study was carried out in the Workplace Health Services of a large suburban health authority in British Columbia. Workplace Health Services provides preventive services for the employees of the health authority and the department is divided into three areas of service delivery: employee safety, disability case management, and occupational health nursing. This case study concerns the re-organization of the occupational health nursing service.

Only the largest organizations have departments employing multiple OHNs. Even in these organizations it is not uncommon that service delivery is modelled on a single nurse practice. This was the situation evident in this health authority. Prior to 2008 the normal practice model for the OHNs was that each acute care hospital of a

certain size in the health authority had an OHN assigned to it, while smaller acute care hospitals, and affiliated sites, would share an OHN (for example, one OHN covered 5 smaller sites). The OHNs had an office and regularly scheduled hours at each facility – larger facilities would have full time coverage (Monday to Friday, 0800-1700) and smaller sites perhaps only 2-3 days per week where the OHNs were present on an appointment basis. The staffing complement was 17 nurses working full time, part time or on a casual basis – a total of 11.4 full time equivalents.

Each location offered a variety of onsite occupational health nursing services which included collecting occupational health histories of new hires; providing immunizations; follow up of communicable disease exposures (e.g. tuberculosis, blood and body fluid exposures); disability management; health coaching and referral; provision of occupational health information and advice to both employees and management; and other occupational health services that might be unique to the particular site. For example, some OHNs provided allergy shots, facilitated Weight Watchers™ meetings and conducted a variety of other onsite health promotion and health service activities such as periodic health fairs, health coaching, health issue awareness campaigns, etc.

Disability management – co-ordinating the care and return to work of employees who are absent due to long term illness or injury — often occupied significant amounts of the nurse's time. Disability case management in this health authority was divided among two different groups within the Workplace Health service. The OHNs handled all cases relating to illness absence, mental health issues, and substance abuse. Cases related to Workers' Compensation claims for workplace injuries were handled by another group within the Workplace Health department.

While there were certain core activities that each OHN undertook, other duties, and the time spent on them, varied from site to site as each site had developed unique roles and expectations for the OHN service over a period of many years. As a participant noted in interview 5: *"everyone did their own thing" - there were a lot of common activities but no cohesive organization."* The occupational health records were maintained as paper based files and while some OHNs began to use an electronic health record system, its use was not consistent. There were a few reasons for this: the

system was in a generic occupational health record format and not particularly suited to their needs; the nurses had received training on the system months before it actually became available, and thus much of the training was forgotten; and finally there was little time or administrative support to begin converting the existing records. The implementation of the system remained a work in progress.

In 2008 a quick succession of infectious disease outbreaks (mumps, measles and chickenpox) in the community resulting in employee exposures, overwhelmed the service capabilities of the OHN staff. It quickly became apparent that employees' occupational health histories, and in particular, records of their immunizations, either did not exist (only about 10-20% of employees had immunity records on file) or were not readily available: "*We had to have access to people's immunity records right away, and they were old, dusty paper files out at [Hospital X], and they were hard to access. They had not been transcribed electronically"* (Interview 5). The lack of immunity records added to an already difficult staffing situation since non-immune staff could not be scheduled to work in areas where they might be exposed to an infectious disease.

In the wake of these outbreaks the work group began to see that a re-organization of service delivery was needed. An offsite "retreat" meeting of the occupational health nurses was held in September of 2008 and, with the help of a meeting facilitator, the nurses brainstormed ideas:

> *We said: we have to change how we're doing things. How are we going to do this? And everybody thought that someone had an answer but actually no one had an answer. Everyone kept saying 'I don't have an answer'*. (Interview 1)

This meeting began the process of departmental transformation. Over a 6-8 month period, and numerous department meetings, the decision to implement several important ideas came about: firstly, the service delivery would be re-organized to focus on key areas of practice; secondly the adoption of new service delivery methods — a "call centre" approach coupled with the creation of a field service team to deliver services as needed at the facilities; and the final piece was the decision to begin using an electronic health records database. This reorganization represented a radical

departure from the previous departmental organization and could be thought of as a move from a site specific focus to a population based service model.

4.3. Defining the Key Areas of Practice

After the brainstorming session, and several other departmental meetings, it was generally agreed that the key areas of practice would focus on the collection of employee health histories, and communicable disease exposure management and prevention. That meant giving up many of the site specific services and more importantly, disability management. Two areas of disability management — Workers' Compensation claims and illness absences — had been taken over by another group within Workplace Health leaving only the mental health issues and substance abuse cases in the OHN's portfolio. These cases continued to be handled by the OHNs due to their sensitive and complex nature however, over time, this arrangement became stigmatizing for the client-employee since it was apparent that if the OHN was involved in their claim it must concern one of these issues. It therefore became imperative that the OHNs should relinquish these cases to the disability group as well. That being said, giving up responsibility for disability case management was a difficult and somewhat controversial decision overall. Two of the OHNs were reluctant to give up this role as they considered it to be an area of practice they were particularly skilled at, and where they felt they made a positive contribution to employee health. They ultimately decided to leave – one retired and the other moved over to the disability management group. Outside of the health authority the move generated a great deal of surprise and consternation in the OHN profession. Disability case management had always been held up as an example of an OHN service that could provide a demonstrable financial benefit to the organization, unlike health promotion and other activities that could not be quantified in the same way. Colleagues expressed concern that giving up this "bread and butter" area of responsibility could be risky. However, the decision to move in this direction was taken after the OHNs made an assessment of their skill set and identified where they could fill a valuable "niche" within the organization. As a participant commented:

> *We were doing DM (disability management) and we were doing counselling and we were doing health promotion. We were doing allergy shots and we were doing everything ... but we didn't have enough OHNs on the ground at each site just to keep that up. And it didn't look like we'd ever be funded for that, so really we had to say – what can we do really well? (Interview 1)*

The Workplace Health department already had safety consultants to deal with the regulatory aspects of occupational health and safety and, as mentioned above, there was already a group handling the majority of the disability management case load. Infection Control Practitioners co-ordinated the care of in-patients with communicable diseases and Public Health followed up contacts of infectious patients in the community. It became clear that the empty niche – employee communicable disease prevention, management and control – could best be filled by the OHNs who had unique skills and knowledge in this area. "*We knew that other professions could do DM but that they couldn't do communicable disease and they couldn't do the immunization piece, and they couldn't do the BBFs* [blood and body fluid exposure protocol]" (Interview 1). The problem of effective service delivery remained – how could a small group of OHNs deliver services to 26,000 employees over a wide geographic area?

4.4. The Call Centre

In searching for a solution to their logistical problem the nurses saw that the incident reporting group within Workplace Health was successfully using a call centre approach to comply with WorkSafeBC injury reporting regulations.

> *We looked at the success of the incident reporting call centre which was quite successful. Within a year 97% of people were reporting [incidents] by phone and that seemed to work and it was getting the [WCB report] forms in within the 72 hours.* (Interview 1)

To get a sense of the physical layout requirements they not only looked at the layout and operation of the in-house incident reporting call centre but also visited the offices of the BC Nurseline – a provincial service that provides BC residents with telephone access to registered nurses for health advice. The managers also joined the BC Contact Centre Association – an industry association for call centre operators.

> *We go to their meetings, we go on their field trips out to other call centres, and we always learn something ....We learned about recruitment...setup of the cubicles, reports, the different telephony systems.*(Interview 5)

It was ground breaking work — no other model of occupational health nursing service using this approach existed. There were other logistical problems to be solved. A participant recalled: "*we did a lot of brainstorming about how the call centre might work."* There were administrative procedures to sort out, things like:

> .... *getting the lab organized, streamlining ... each of us had developed forms and protocols ourselves for our work...so we had to mesh all of that. We needed to put everything online so it was accessible to all*. (Interview 2)

Although the OHNs were already used to doing some of their client interactions on the phone they also received special training on call centre operation. A participant noted they need to know *"... call centre stuff. How do you work the phone? It's a far different phone. It doesn't even have a handset....you punch in codes for when you're not ready, when you're live."* The final key decision was to fully use the Workplace Health Indicator Tracking and Evaluation (WHITE) database as an electronic health record.

4.5. WHITE

WHITE had originally been developed by the Occupational Health and Safety Agency for Healthcare (OHSAH), a joint venture of health care employers, researchers and unions in British Columbia, in order to develop a comprehensive, province wide database of health care incident, injury and illness data. The impetus for this initiative came from the 2004 British Columbia Auditor General's report in which he observed:

> In 2000, the total cost (including both direct and indirect costs) to British Columbia's health authorities attributable to medically related absenteeism and presenteeism (reduced productivity of ill or injured employees who remain at work) was nearly $1 billion annually. (Strelioff, 2004, p. 1)

He further pointed out that in combination with limited budgets and focus, “health authorities lack good integrated information about employee health and the work environment which makes it difficult for them to build on their initial steps” (p. 3).

Work had begun on WHITE in 2002 and it was first released in 2004. Over time it evolved into a web based system containing 5 modules covering functions such as incident and injury reporting and documentation; electronic submission of Workers’ Compensation Claim documents and claims cost tracking; recording and tracking of long and short term disability; and documentation of worker training and education. It also had the capability to be used as an employee health record to document and record employee health histories, immunizations, communicable disease exposures, and allergies. By 2009 it was being successfully used by the other departments in Workplace Health.

Before the implementation of the WHCC, WHITE was available but not uniformly used by the OHNs — some used it and others did not. To that point in time it had really not been customized for use by the OHNs and as previously mentioned, inadequate training had been an issue. While it had been a long term goal to eventually have all occupational health records entered into WHITE (both retrospective and new information), operational constraints – mainly the resources needed to transcribe existing records into the system — prevented that. The crisis in service delivery in 2008 made it apparent that a uniform adoption of WHITE was an imperative.

Fortunately for the OHN group, the original information technology (IT) team that developed WHITE in 2004 was, and is, still involved in its continued operation. Since the IT team has had a long association with occupational health services they understand the work of the group and the types of data needed. The OHN group was given a designated analyst to oversee the customization of the online occupational health nursing modules and this proved invaluable. A participant commented*: “he can tell you all the communicable diseases, all the definition criteria for exposure, everything, because we’ve trained him over the last three years.”* The OHNs soon began calling the designated analyst the “WHITE knight” because he is available to them anytime there are system issues. The analyst told me *“primarily my job is to make sure that WHITE works for the project”* (Interview 9).

4.6. Implementation

The reorganization of services took several months to accomplish and there was a period of time when the call centre and the old site service model co-existed. Gradually the onsite services were replaced by the field services teams that came on site only at scheduled times to conduct immunizations, TB screening, or other scheduled events. Regular services by site OHNs were curtailed and their offices shared out with other groups.

The change in service delivery was communicated to managers and administrative assistants in the various clinical areas. Initially the focus was on areas deemed at high risk for communicable disease exposure – Emergency, Medical Laboratory, Imaging, Critical Care, and Pediatrics — and the plan was to gradually bring in other departments. The announced date of implementation was January 5, 2009 but the Workplace Health Call Centre actually took its first call on November 26, 2008. A participant commented "*everyone just started calling – employees were already used to reporting incidents to the call centre, so actually, it wasn't a huge leap.*" (Interview 10) The new service was also featured on the corporate intranet home page, and handouts and posters were distributed (see examples in the Appendix D). When the annual fall influenza immunization campaign began (in late September) the scheduling of mass clinics by the field services team (rather than the clinics formerly done by site-specific nurses) highlighted the new approach.

The first stage of the call centre implementation focused on revamping the process of obtaining new employee health histories, in particular a review of their immunization and immunity history for chickenpox, measles, mumps, rubella, hepatitis B, and screening for tuberculosis. Healthcare employers have a regulatory obligation to ensure that employees will not be put at risk due to exposure to infectious diseases so a complete immunization history is a key element in due diligence. The health history provides vital information during an infectious disease outbreak when staffing decisions have to be made. Prior to implementation newly hired employees (as many as 300 per month in this large health authority) were instructed to schedule an appointment at the OHN's office (which could be in another facility) so that a health history could be created in person. Once there the health history took, on average, 30 minutes to complete.

Since health care workers typically work busy 12 hour shifts it is not surprising that the health history was often never done – the department estimated that only about 10 to 20% of new employees ever completed the process. Realistically, given the number of new employees, completing the health histories on all new hires would have been more than a full time commitment for one OHN so the requirement was never strictly enforced. The advent of the WHCC meant that new employees were directed in their letter of hire to call the OHN to complete the health history. Completion times dropped to below 10 minutes due to automation of the process using WHITE. If the employee requires immunizations for their new position, the OHN advises them when the next field services team will be at their facility, and if laboratory work is required to determine immunity the OHN can email the necessary requisition to the employee and follow up with results. The newly streamlined process surprised employees. As one participant noted: "*so we've gone from 30 minutes to five minutes and people say, is that it? That was really easy.*" (Interview 12) Staff found the new drop-in immunization clinics to be very convenient – a total of 4,000 staff, both new and current, attended the clinics in 2009.

The second aspect of the new system – post exposure management of blood and body fluid exposures — was implemented in March 2009. Under the new system an employee who experiences contact with blood or body fluids can call the WHCC and speak directly with an OHN. Using WHITE the OHN documents the incident, provides individual counselling to the employee and if necessary emails laboratory requisitions, refers to medical treatment, or if applicable, advises on the availability of immunization clinics offered by the field services team. A follow up protocol will be implemented that tracks laboratory results, matches incident source and victim results, and if necessary, flags the file for future follow up. The WHCC also receives notification of blood and body fluid exposures of health care workers reported to Emergency Departments and all follow up laboratory results are centralized to the call centre for a more consistent approach to documentation and management.

The final piece of the service was to centralize the documentation and follow up of all occupational communicable disease exposures with the call centre. Examples of these diseases include meningococcal disease, mumps, measles, pertusis, and tuberculosis. In the event of an exposure, the OHNs are notified by the health authority Infection Control Practitioners. The OHNs use protocols based on the guidelines of the

British Columbia Centre for Disease Control to determine if employees meet the definition of exposure and if they require protection through furloughing, immunization, or prophylaxis.

4.7. Operation

Initially at start-up two OHNs operated the phone lines:

> *At first we had kind of makeshift stations. We didn't really know how to operate the phones. It was hit or miss who was going to take the call...when the phone rang we'd say "who's going to take that one"* (Interview 2).

To ensure continuity, standardized protocols needed to be developed and refined for consistent exposure reporting and management. Many of the new protocols were created as they went along. One participant stated:

> *We were laying them out day by day, minute by minute ... each of us had developed forms and protocols ourselves for our work... they were each a little different, so we had to mesh all of that* (Interview 2).

As previously mentioned, developing the call centre protocols meant liaising with other professional groups within the health authority. This often entailed navigating a complex bureaucratic organization. For example setting up a system whereby the OHNs could order laboratory testing for antibody levels and receive the results back in the department meant gaining the co-operation of the Medical Officer of Health, the Provincial Laboratory, and then getting the necessary system set up by IT services to receive the results electronically. A participant explained how they used their networking skills: "*We did a lot of 'schmoozing' ...we would invite the managers and medical health officers down for tea so we could meet them face to face and show them what we were doing and why we needed something." (Interview 10)* Additionally, the WHCC team leader was a long time health authority employee and used her network of contacts to determine key individuals: *"sometimes finding out who to talk to is the hardest part in getting something done around here"* (Interview 1).

The reorganization of service significantly changed the practice of the OHNs. Some of the OHNs had not previously used an electronic health record system, and were used to having much more face to face contact with clients rather than interacting in a mediated fashion. In addition they were used to having an independent model of practice that included responsibility for their own specific location and employee population. In the new service organization the OHNs were located either in a central office at a call centre station, where they did not see clients face to face, or on the field services team travelling to many locations to deliver scheduled services. While this could have been a demoralizing factor all study participants expressed excitement for the new approach: *"it was something that had never been done before and it sounded like a really good challenge"* (Interview 7); *"it is really modern, very futuristic...and very immediate"* (Interview 4). The OHNs also had the opportunity for flexible assignments, with some alternating between the field services team and the call centre team. There were also flexible hours and part-time and full-time assignments available.

The new system required a short period of adjustment for some long term health authority employees and managers. As one participant noted: *"they'd still be phoning ... 'I can't find my nurse, the office is gone' ... a lot of them didn't like the fact that their nurse wasn't there anymore*" (Interview 7). However, managers and staff soon realized that the service reorganization actually made OHN services more widely available to all staff every day (Monday to Friday, 0700 to 1700) whereas in the past employees at smaller sites might only have access to the OHN 2 or 3 days per week.

Aside from better service availability, it quickly became apparent that the call centre approach had other immediate benefits. In addition to increased compliance with new employee health histories, data on communicable disease contacts such as tuberculosis, needlestick injuries, and blood and body fluid exposures could now be systematically collected for trend analysis. More importantly, the system had surge capacity: in the event of a communicable disease outbreak more OHNs could be added to the call centre and field services teams could be deployed for mass immunizations. This capacity was demonstrated during an outbreak of pertusis (whooping cough) in the summer of 2012 and again in 2013 during a measles outbreak.

4.8. Physical Layout

I had the opportunity to tour the facility on several occasions during the study period. The call centre is located on the fourth floor of a suburban office tower. It is a large open space shared by all of Workplace Health. There are no private offices only a series of cubicles separated with low dividers. There are large windows on two sides of the office, and the absence of tall dividers and diffused lighting give a feeling of bright, open spaciousness. There are a series of meeting rooms located on the perimeter of the area – these rooms range in size from those accommodating a dozen or so people to small, single person "telephone" rooms. There is also a common area where there is coffee and tea available and a large table. This area is used for the "morning huddle" and other informal gatherings. The nurse's call stations consist of an adjustable computer desk and chair, computer with adjustable keyboard, two computer screens and a telephone with headset. The desks are aligned in a row set at an angle to the windows to reduce computer screen glare.

4.9. Expansion

Internal documents show that by June 2009 Workplace Health Services had developed a business case which proposed expanding the services of the WHCC to other health authorities (personal communication, June 8, 2009). This expansion began with the addition of another local health authority in July 2011, and the Ambulance Services in January 2012. Making these expansions work required further administrative developments, for example arranging for field services in the new client areas, while the calls were still handled from the centralized call centre. As these expansions proved successful, other provincial health authorities were added one at a time during 2012, with the final addition in September 2012. This brought the total number of employees served by the call centre to 110,000. I think at this point it could certainly be said that the innovation of the WHCC had become normalized not only in this health authority but throughout the province.

Since the focus of my study is to understand how and why this new way of providing OHN service came into being, my narrative of "the case" finds a natural

conclusion here. Of course in “real life” the operation of the expanded WHCC continues on with great success.

4.10. Conclusion

In this chapter I have attempted to paint a picture of the background, development and implementation of the WHCC to provide the reader with the “thick description” advocated by Ryle (1968) and other researchers in the qualitative tradition. In the next chapter I will provide a detailed analysis of the case study related to the constructs of NPT.

5. Data Analysis and Interpretation

The purpose of this instrumental case study was to evaluate the utility of the theoretical constructs of NPT in order to understand the successful normalization of a complex intervention. The case study focused on the successful practice reorganization and normalization of a call centre approach in an occupational health nursing service. This chapter describes the analytic process used and includes a discussion of the results relating to the constructs of NPT arising from in-depth interviews of study participants, observation notes and documentary analysis of the case study.

5.1. Analytic Process

As discussed in Chapter 3, data were analyzed using the "framework" method as described by Richie and Spencer (1994) and Ritchie, Spencer and O'Connor (2012). The framework approach to data analysis involves 4 steps: familiarization with the data, identifying a thematic framework, indexing, and interpretation.

I began by reading the transcribed interviews, observations and documents several times (familiarization) and then began to highlight key passages and develop in vivo codes to create the thematic framework. I then compared the in vivo codes to the definitions of the NPT constructs and assigned them to the relevant NPT codes (indexing). By using the in vivo codes in this way I tried to use the authentic voices of the participants to guide the selection of NPT codes rather than merely forcing the data into the NPT framework. I was mindful of the caution by Bloomberg and Volpe:

> All researchers enter the field with a certain perspective and certain assumptions, yet the material should not be addressed with a set of hypotheses that you set out to prove or disprove. Rather, you need to approach your transcripts with an open mind, seeking what emerges as significant from the text. (2012, p. 137)

Therefore the method I employed involved reviewing the key passages, selecting and highlighting in vivo codes, and then deciding which NPT codes were most appropriate.

5.2. Selecting NPT Coding Categories

I used the following NPT coding framework to assign codes to the passages selected in the in vivo coding process.

5.2.1. Coherence (C).

Data were considered to refer to the construct of coherence (C) if they described sense-making work by the participants. Sense-making work is done individually and collectively when a work group is faced with the problem of operationalizing a new set of practices.

It is only natural that when a new practice or set of practices is implemented, individuals and work groups ask – what is the new practice, what does it entail, and how does it affect me and my job (in other words is this a good thing or a bad thing)? Therefore the construct of coherence is broken down into the sub-constructs of: (C1) differentiation – how a set of practices is different from another, particularly comparisons between an old and new practice; (C2) communal specification – a shared understanding of the aims, objectives, and expected benefits of a practice; (C3) individual specification – how participants understand their specific tasks and responsibilities in the new/old practice; and (C4) internalization – how people understand the value, benefits and importance of the new practice.

5.2.2. Cognitive participation (CP).

Data were coded to the category of cognitive participation if they concerned the relational work done to build and sustain the new practice and the work required to make the new system work. Subcategories include initiation (CP1) – work done by key individuals to move the new practice forward; enrollment (CP2) – work done by the group to build and sustain the practice; legitimization (CP3) – the sense that participants had that it was right for them to be involved in the new practice, that it fits with what they

perceive is their role and expectations; and activation (CP4) – evidence that participants collaboratively defined the actions and procedures needed to sustain the new practice and to stay involved.

5.2.3. Collective action (CA).

Data were coded to the collective action category if they pertained to the operational or enacting work needed to build and sustain the new practice. Subcategories include: interactional workability (CA1) concerning the workability between people and artefacts, for example the degree to which WHITE enabled or impeded the work; relational work (CA2) – the knowledge work that people did to build accountability and maintain confidence in the new practice, and each other, including their trust in the new systems and technologies; skill set workability (CA3) – the allocation of work in the new practice and how WHITE fitted with existing work practices, skill sets and perceived job role; and contextual integration (CA4) – the overall fit of the new practice with organizational goals and context, and the extent to which the organization possessed and/or allocated resources to the new practice to ensure its success.

5.2.4. Reflexive monitoring (RM).

Data were coded to the reflexive monitoring category if they described the appraisal work done by participants to assess and understand how the new practice affected them and others around them. This category acknowledges that when any new practice is implemented both individuals and the organization make assessments, either formally or informally, about how well it is working. Individually, people begin to form either positive or negative impressions of a new practice almost immediately; it becomes a topic of conversation among coworkers and a group consensus develops. In cases where the new practice has shortcomings, workarounds and reconfigurations may take place. Therefore the subcategories include: systemization (RM1) – formal or informal assessment of the effectiveness of the new practice; communal appraisal (RM2) – assessment by the workgroup of the effectiveness of the new practice; individual appraisal (RM3) – individuals assessed how the new practice affects them personally;

and reconfiguration (RM4) — indications that individuals or the work group itself attempted to modify or redefine the new practice.

5.3. Coding Example

The process of selecting and translating the in vivo codes is described in the following example in which a participant described the department's difficult situation prior to the call centre:

> So we found ourselves trying to *struggle to keep up* with all the different demands made on us. We were doing DM (disability management) and we were doing counseling and we were doing health promotion. We were doing allergy shots and *we were doing everything*. And we were getting to the point where we were growing as an organization, but we *didn't have enough occupational health nurses* on the ground at each site just to keep that up. And it didn't look like we'd ever be funded for that, so really we had to say '*what can we do really well?*' ... because we were finding that ...we knew we did DM really well, but then we would have a TB exposure or an outbreak of something, and we'd have to drop what we were doing and run over and do this, so that really *wasn't working for anybody* [emphasis added] (Interview 6).

The in vivo codes highlighted in the above passage captured a sense of both personal and collective assessment. When I compared these codes to the NPT constructs I found they closely matched the categories of reflexive monitoring: communal appraisal (RM2) and individual appraisal (RM3) – participants individually and communally questioning 'is this system working' – clearly it wasn't working for the OHNs.

5.4. Data Interpretation

5.4.1. Collective action (CA).

The coding category that had the highest number of data matches was collective action – the enaction work of implementation. There was a strong theme in all the participant interviews that the call centre approach fit very well with the OHNs existing skill sets and job role expectations (CA3 — skill set workability).

Several factors contributed to this match. The OHNs were already used to providing some of their services to clients over the telephone. As one participant observed

> *...it's the same work only you're doing it on the telephone....I mean we talked to a lot of our people by telephone [before]. Some of the DM [disability management] people I never even saw, so you know, that wasn't new* (Interview 2).

Although the new telephone sets required some familiarization: *"it's a far different phone – it doesn't even have a handset.... you punch in codes for when you're not ready, when you're live, what you're doing"* (Interview 5), a training program at the time of installation apparently alleviated any difficulties.

Another skill set hurdle was beginning to enter data into the WHITE program. Some of the OHNs had previously used WHITE although, at the inception of the call centre in 2009, WHITE had not really been customized to enter the type of data the OHNs needed: it was configured for a generic occupational health practice. Over time WHITE modules had been customized by IT services for use by the disability management group, the safety professionals, and the incident reporting call centre. Fortunately, the original IT design team remained intact over the years and when it came time to develop the OHN's part of WHITE, the design team already had an excellent understanding of the business of Workplace Health – their regulatory environment, values and goals, the organizational culture, and way of operating. Importantly, a lead analyst from this group was assigned to the workplace health call centre project. The OHNs quickly began to refer to him as the "WHITE knight" since he worked closely with them to develop the custom elements they needed and was there to troubleshoot any issues that came up: *"We made him an honorary OHN, I gave him an honorary [nurse's] cap – electronic mind you"* (Interview 5).

Many participants mentioned their involvement in developing the necessary online forms, protocols and screens and it was apparent that it was seen as a positive and collaborative exercise that drew on their knowledge and experience. A training program was developed for new hires that gradually eased them into full use of the system:

> *I was made to feel comfortable ... especially being a new employee in a huge organization it's very overwhelming... but it [the training] was very well organized that I was able to grasp and learn to the best of my ability ....you can turn to anybody and there's teamwork* (Interview 4).

Relational integration (CA2) — the knowledge work involved in building accountability and confidence in new practices — was also evident. Participants mentioned that the online system enabled group work that was not possible when each nurse held individual files. They pointed out that the new system used standardized protocols and records so that they could deliver a more cohesive service with the field services teams: *"the nurse in the field will tell you exactly the same thing about your immunization history or about what your next steps are, if it's been an exposure or whatever, it's all very seamless."* (Interview 3)

Interpersonal contact with clients is an important aspect of nursing theory and practice and it was apparent that the field services teams helped to foster this connection. To that end it should be pointed out that the call centre is only half of the service: the field services teams are understood as an equally important component of the service that provides face to face contact with clients. A participant noted: *"I don't know that a completely mediated service would be that successful. I think it's successful because there are people associated with it. People are people and they like to know who they are talking to." (Interview 6)*

Several other participants commented on the advantages of having the OHNs periodically rotate through field services. They felt it not only helped them to gain an understanding of that part of the service but that it also enabled employees to put a face to a name and for the OHNs to connect to employees. This is highlighted in the following exchange:

> *Researcher: Does it ever happen that you talk to somebody on the phone and then meet them out in the field? Participant: Oh, that's actually happened...it just happened in [X location] last month, and I was looking at her letter that she handed me and I'm, like, "Oh I sent this to you." (Interview 14)*

The new system also enabled better statistical reports so that it became easier for the department to demonstrate the value of their work to the employees, other professionals, and the organization at large. For example a participant explained:

> *…before we had the call centre, we didn't know how many blood and body fluids [exposures] we were having throughout the area. We didn't know how many TB exposures we were dealing with. We all had binders, but we weren't doing it electronically; we didn't have a data warehouse. (Interview 15)*

In one instance call centre data enabled the OHNs to quickly identify a cluster of tuberculosis exposures in a particular hospital unit. When the safety group investigated it was found that employees were not wearing the appropriate respiratory protection. By being able to identify occupational health issues at an early stage the OHNs began to increase their organizational presence and credibility and it also contributed to their personal sense of professional satisfaction and efficacy. For example in the course of developing their communicable disease protocols, they gained a level of expertise that began to be recognized by other professional groups. A participant commented:

> *I think where we've got to is a level of expertise where we can phone the virologist at the BCCDC [British Columbia Centre for Disease Control] and talk him on a first-name basis ....or we can just call our MHOs [Medical Health Officers] and be greeted with a very high level of respect from their end ... and that they respond to us as a partner ... and that's changed, I think. (Interview 14)*

Their level of expertise with communicable diseases gave the OHNs back the opportunity to play a greater role in health teaching and prevention – something that was consistent with their professional goals and perceived job-role, and which many felt they had lost in "the race to do everything." For example a participant noted that the call centre approach:

> *...allows us to do something that I think a lot of us went into the field for, which is prevention...[before] all the stuff we were doing around health promotion and prevention went out the window, in the name of doing a gazillion [sic] return to works, so you didn't have time to do the other stuff. (Interview 11)*

Others mentioned they enjoyed the ability to do health teaching when employees call with questions: "t*here's an opportunity to do in the moment teaching with them"* (Interview 6).

A common theme from the interviews supported a consensus that the call centre approach enabled them to act with expertise so they could provide not just a different service to their clients but a more focused and higher value service to both employees and the organization, and that this was more personally satisfying and consistent with their job expectations as OHNs than the former model of practice.

Others pointed out that sometimes employees have a health question or issue that is not really related to the call centre services *"but sometimes they want to talk about something else, you know....they still want an OHN"* (Interview 8) and in this way they were reassured that their broader OHN skills are still important, valued, and recognized as a resource to be drawn upon. While the re-orientation of practice in the WHCC could potentially de-skill OHN practice, in fact the OHNs appear to view it as "up-skilling", that is, it utilizes and enhances their existing expertise and tacit nursing knowledge.

Analysis of documents showed there was strong evidence of contextual integration (CA4), that is, the initiative was compatible with the overall goals and structure of the organization and that it fairly quickly gained the attention and support of senior management as its value was recognized. These documents also show that the project was allocated significant technological support for telephony and, as mentioned above, technical support for the customization and implementation of the occupational health modules of WHITE.

5.4.2. Reflexive monitoring (RM).

Reflexive monitoring is the appraisal work that people do either collectively (RM2) or individually (RM 3) when a new practice is introduced. In my analysis it had the second highest category of matches. As mentioned previously in this chapter, there had clearly been a great deal of communal and individual appraisal within the group, both before and after the changes began. As to be expected within a working group, not everyone was receptive to change; some OHNs preferred the previous practice model

and decided to leave. Fortunately there were other options for them – retirement in one person's case, and for the other a lateral move to the disability case management section of Workplace Health. Two other participants indicated that they initially had doubts but quickly overcame them. One recalled:

> *I'm not adverse to new things, I just didn't see myself working in that environment, in the cubicle, no patient contact, no client contact, phone and computer all the time ....so anyways I did take it on ... and I would say almost right away I really got into it, I really enjoyed it.* (Interview 3)

Aside from many comments that reflected positive "this is working for me" assessments there were also many comments that indicated the OHNs were enjoying their work and were satisfied that not only were they were delivering an excellent service that enhanced their job role, but that they were also providing a service that was appreciated by the employees – in other words - the new system was "working for us." One participant's comments summed it up: "*most employees like the system because it's quick...and it's efficient, and they're surprised, a lot of them, that it's that fast and that easy ....I think we're giving really good service to the employees.*" (Interview 15)

The reconfiguration category (RM4) was difficult to assign since it is defined as attempts to modify or reconfigure the new practice or procedures. Since the OHNs were actively involved in developing and configuring the new practice as they went along it is somewhat problematic to call that reconfiguration. However there is evidence that they were, and still are, reconfiguring and streamlining old practices that continue to impact the new. For example in the old practice, getting necessary laboratory results from the provincial laboratory had been slow and cumbersome. *"Now we've worked out a system with BCCDC where we have a client number ... the results are automatically downloaded to [us here in] the call centre"* (Interview 3). It was apparent that the group was moving forward rather than trying to revert to former practice for example, the old paper based systems had been abandoned and nurses no longer kept their paper based records and binders of notes.

In keeping with the STS notion that technology is never finished (Kling, 1999; Latour, 2005) the WHITE system continues to be upgraded and the occupational health database continues to evolve with inputs from the OHNs. One participant described how

the “WHITE knight” streamlines processes for them by creating templates for frequently used letters or forms, or by reducing the number of “clicks” required to reach a certain screen.

The category of systematization (RM1) refers to formal evaluations done to determine the effectiveness of a new practice. Unfortunately due to limits imposed by the terms of my ethics approval I was not able to access any formal evaluations presented to senior management however, I did receive a graph showing a detailed analysis of the call centre volume during the period of January to December of 2012 which showed that the call centre had handled 21,964 calls during the year. The calls could be broken down roughly into thirds: about one third of the calls related to new employee health histories, another third related to communicable diseases and the final third general inquiries. In other words, the call centre was providing exactly the service it was designed to do.

5.4.3. Cognitive participation (CP).

Cognitive participation – the relational work done to build and sustain the commitment to making a system work – was the third most frequent match. Initiation work (CP1) – the involvement of key individuals both from within and from outside the department was frequently mentioned. It was apparent from the beginning that they would have to secure the support of key individuals from outside the department. In the prevention and management of communicable diseases, several departments and outside agencies provide, often overlapping, services and roles. Some of these include health authority Infection Control and Public Health practitioners, the Medical Officers of Health, and the hospital-based laboratories. Services and direction are provided by the British Columbia Centre for Disease Control (BCCDC) and the Provincial Laboratory. As discussed in the case study (Chapter 4) the department made a considerable effort to get to know key external individuals on a first name basis and sometimes just finding out who the key people were and establishing a face to face contact was a big part of the effort. One participant recalled:

> *We were able to take a morning and go down to the Prov. Lab (Provincial Laboratory), to meet the supervisor and tour the place. So if there’s any issues we know who to call down there or he calls us.... and the same*

with the ICPs (Infection Control Practitioners) we invited them all to tea one day and so then you could put a face to a name. (Interview 8)

Some of this work could be described as enrollment (CP2) – educating other departments and agencies as to what the new role of the OHNs would be and how they would interact. The manager and team leader were particularly involved in this activity attending meetings in a variety of departments and sites.

There was strong evidence of legitimization (CP3) – the sense that participants felt it was right for them to be involved in the new practice. In fact it is apparent that participants felt it was more than just 'right', many of those interviewed expressed pride and excitement to be involved in the new practice:

I just thought it was a really unique idea...it's something that hadn't been tried before and I just thought it was exciting. The principles [of occupational health nursing] are the same, but the way of interaction with employees is totally based on a different concept, which is really modern, very futuristic…I'm so proud of being a part of it. (Interview 8)

At the same time *"there were some people, clearly, that didn't want to do any of this"* (Interview 1) who left the department in the early development stage, thus some self-selection had taken place and the group going forward had a high level of commitment to the project – those involved had chosen to be there, rather than having the new role imposed upon them. Nurses hired to fill the vacant places were attracted by the uniqueness of the service: *"I thought it sounded very exciting, extremely exciting, and I'd never heard anything like it before. I thought – I want to try this"* (Interview 7).

Activation – collaborative action (CP4) — was another frequently mentioned aspect in the cognitive participation category. It was evident that participants felt a strong sense of teamwork within the work group. Participants mentioned how they had been involved in developing procedures and systems and that there was an environment of mentoring and teaching:

It's a teaching group. They all believe in teaching. Everybody teaches each other. Everybody gets together. They have huddles and they bring up issues so that everybody is clear on certain grounds, so things are done on the standardized needs (Interview 4).

Several participants mentioned the morning huddle as an example of team building and communication. The huddle takes place before the phones are switched on each morning. It is an opportunity to bring up and discuss issues and ideas, and make sure everyone is clear about their assignment for the day. There is a fun element too:

> *I think one day, it was just one of those days people were saying it was a full moon, and I said "I'm going to read everyone's horoscope" and everybody had such a good laugh that I just kept doing it.... it's our way to connect and start the day with a laugh.* (Interview 1)

5.4.4. Coherence (C).

Although the category of coherence (C) — sense-making work — had the lowest number of verbatim data matches it was apparent in the interviews that the workgroup not only understood the need for change, because the old arrangement *"...wasn't working for anybody"* (Interview 1), but since many had been actively involved in the development of the new approach from the beginning they had a clear understanding of its aims and objectives and what their roles were: *"we did a lot of brainstorming about how the call centre might work"* (Interview 1). As a result, participants had a good understanding of their specific tasks and responsibilities both individually and communally (C2, C3) because they were given the opportunity to participate in the development of policies, and procedures. For example, the workgroup has input when there are any upgrades to WHITE. As a participant explained:

> *They [the WHITE support group] always ask us for our input and when there's any kind of upgrades ... one of us, at least, is always on the teleconference line. Okay this is going to work, no this isn't going to work, this is too much information... (Interview 5)*

Aside from the morning huddle, practice consultations can take place at any time something comes up that needs clarification. Several participants made reference to situations where non-routine calls required on the spot consultation with the group or perhaps other professionals. For example, a participant recalled that on one occasion

she received a message from the laboratory that a sample positive for Creutzfeldt-Jakob Disease[2] had been received: *"...we had to go look it all up, what we do, and get back to them…so yeah, it's constant learning"* (Interview 7). In this way, sense making is an ongoing process that contributes to participants' professional knowledge and skills and it is handled in a collaborative way that draws on, and enhances, the expertise of the group.

It was apparent in the interviews that participants view the new approach as an important and ground breaking development in the delivery of occupational health nursing services and are excited to be a part of it: *"it's an amazing system, it's an amazing program, and I think Workplace Health is quite something"* (Interview 3).

5.5. Conclusion

This chapter provided a description of the process used to synthesize the results of participant interviews, documentary analysis and site observations using the constructs of NPT as an analytical framework. In doing so, I have used the excerpts from the participant interviews to illustrate alignment with the constructs.

In matching the verbatim comments from participants with the constructs I found that collective action had the greatest number of matches, followed by reflexive monitoring, cognitive participation, and coherence. A graph of the coding frequencies can be found in Appendix F.

[2] A rare degenerative neurological disease thought to be caused by infectious prions.

6. Research Questions, Findings and Discussion

6.1. Introduction

The purpose of this study was to evaluate the utility of the constructs of NPT by applying it to a case study of a successful complex intervention. The complex intervention chosen not only reorganized the professional practice of a group of occupational health nurses, but also involved the implementation of an electronic health records system and an advanced telephony system to deliver occupational health nursing services to a large employee population over a wide geographic area. In the researcher's experience, and as discussed in the literature, interventions of this scale and scope seldom successfully become part of everyday practice, yet there is increasing demand to leverage resources by the use of telehealth systems and other health information technologies. As Pope et al. comment:

> ICTs (information and communication technologies) are often proposed as technological fixes for problems facing healthcare. They promise to deliver services more quickly and cheaply. Yet research on the implementation of ICTs reveals a litany of delays, compromises, and failures. Case studies have established that these technologies are difficult to embed in everyday healthcare. (2013, p. 1)

NPT offers a conceptual framework that contributes to the understanding of how this type of complex technological change can be facilitated and how its use would allow managers to proceed from an informed perspective when designing and implementing these types of programs. Moreover as May, Sibley and Hunt (2014) note:

> NPT supports the analysis of nursing work by focusing on the ways that clinical nursing practice is made coherent and meaningful, how it leads to sets of relational commitments, how these contributions are enacted and contextualized, and how they are appraised and reconfigured. (p. 298)

This chapter presents the key findings obtained from 11 in-depth interviews, 6 follow up interviews, a review of organizational documents, and numerous site observations. In addition, key informants provided verification of facts, and updates on the progress of the intervention throughout the study. The following research questions were addressed:

1. Who were the key actors and what specific work did these actors engage in to normalize the intervention?
2. How is this work understood by those involved?
3. Does NPT accurately identify the factors that led to the normalization of this complex intervention?

6.2. Research Question 1

The first research question asks: who were the key actors and what specific work did these actors engage in to normalize the intervention? Key actors were individuals and groups who had the power to advance or restrict the development of the program. Greiner and Schein (1988) define power as "the capacity to influence another person or group to accept one's own ideas or plans... in essence, power enables you to get others to do what you want them to do" (p. 13). Typically, formal power in organizations is conferred on individuals by positional power. Schein (1985) describes positional power as a combination of three factors – job title, job description, and prescribed responsibility. It provides the incumbent with the formal authority to allocate and direct people, finances, and other resources.

Less formally however, certain individuals in organizations possess personal power – described by Greiner and Schein (1988) as comprising knowledge power, personality traits, and support of others. Knowledge power is derived from expertise in a subject area that meets key organizational needs, and/or the ability to identify, create, and manipulate information in a way that is seen to benefit the organization. Certain individuals possess personality traits that give them personal power; these include the qualities of charisma, reputation, and professional credibility. In addition, the support and goodwill of colleagues, and the ability to gain access those in positions of power

also add to personal power by providing access to information not widely known, or the ability to influence key decision makers.

A key assumption of NPT is that there is specific work that either promotes or hinders successful implementation of a complex intervention. NPT defines work as "purposive social action that involves the investment of personal and group resources to achieve goals" (May & Finch 2009, p. 539). In broader terms NPT asks: how does the work get done; how is it understood by those doing it; how is it distributed, and how is it supported (May, 2008).

In the following sections I will describe how key actors used various combinations of formal and informal power to create and carry out the work of the WHCC and how these actions relate to NPT constructs.

6.2.1. Senior management.

Communicable disease outbreaks have a high profile in the community served by the health authority described in the case study. Over the past five years there have been several outbreaks of vaccine-preventable diseases such as influenza, measles, mumps, and chickenpox. These outbreaks have not only been highlighted in press reports but have also caused operational interruptions when non-vaccinated or non-immune staff had to be furloughed to prevent infection. Thus the control of communicable diseases, and the ability of the health authority to operate during an outbreak, is a high priority for the senior management.

The WHCC is a project that closely aligns with this organizational need. In examining the case study it can be seen that managers at the Director, Senior Management, and Managing Consultant levels used their formal authority purposefully to allocate resources and direct workers to facilitate WHCC development and this management level work directly enabled the staffing, funding, and organization of the Call Centre. It also included securing the involvement of IT Services in developing and supporting the WHCC application of WHITE. A review of documents showed that the value of the project was recognized and endorsed by senior management early on and that the management group continued to take an interest in its progress throughout.

From the NPT perspective this work indicates that the intervention had a high level of contextual integration with the overall goals of the organization, and that there was both willingness and capacity in the organization to support it.

6.2.2. Department management.

As the direct area managers the Managing Consultant and Team Leader of Workplace Health were key actors in conceptualizing, facilitating, and leading the change that would result in the WHCC. They employed a collaborative management style, encouraged a collegial teamwork environment and used coaching techniques that engaged all the OHNs. Commensurate with a professional working group, the WHCC was not set up like a stereotypical call centre with rigid rules, keystroke or call monitoring. Flexible working arrangements were made available for those nurses who wished to work part-time, or have the option to rotate to the field services team.

An important part of the manager's work was promotion: they attended meetings with other department and unit managers to describe the change and solicit feedback from stakeholders. They approached and set up meetings with colleague groups — the allied professional groups who have roles that overlap with the WHCC — that included Public Health, Infection Control, the Medical Officer of Health, and the Clinical Laboratory. Here they made efforts to establish personal connections by inviting other groups to the department "for tea" or by visiting other departments in person. This provided an opportunity to put faces to names and explain the operation of the call centre and the roles of the OHNs. This removed past uncertainties about what the OHN role was. It also enhanced the group's informal power base by establishing their professional presence and credibility, improved their access to information, established a network of relationships, and gained them the support and goodwill of colleagues. For example, the OHNs found it less intimidating to call the Medical Officer of Health once they were on a first name basis, and easier to contact the laboratory when they knew who to ask for and who they were speaking to. Conversely, once these links had been established they found that other departments were more likely to contact and involve them proactively and were more willing to share information. Large organizations are impersonal in nature and this relational work paid off by raising their organizational profile, presence, and professional credibility.

It could be said that the work of the department managers constituted enacting work — the operational work necessary to build and sustain a practice. Their communication and facilitation work done to build links with the allied professionals, unit and department managers, and employees contributed to relational integration – the integration of existing practices and the promotion of trust and accountability between groups.

6.2.3. OHNs

The OHNs were another group of key actors. It was apparent in the interviews that there was a high level of buy-in and commitment by individual OHNs. The OHNs had been involved in discussions concerning the reorganization of the department from the beginning and those who were unwilling to engage with the new practice format left, so that the group that moved forward had essentially self-selected to the project. New employees were attracted by the uniqueness of the practice and the collegial atmosphere. These factors resulted in a high level of workgroup engagement. The entire workgroup was actively involved in the work of developing the project and all participants indicated ways they had been engaged in the work, for example, developing processes and protocols, attending meetings, providing input to the WHITE user group, etc.

The NPT construct of skill set workability was demonstrated in this study. Skill set workability refers to the degree to which the new initiative fits with existing work practices, skill sets, and perceived job role. It contributes to legitimacy – the sense that it is right for participants to be involved in the new practice. In this case the OHNs felt that the new practice built on, and enhanced, their existing role and skills, that it enabled them to provide a better service, and that the new approach was in fact “up-skilling” rather than de-skilling. This is an important finding given that job role and skill set incompatibility is a commonly cited feature of telehealth failures (see for example Broens, 2007; Elwyn et al., 2008; Pope et al., 2013).

6.2.4. Allied departments.

As mentioned above professional colleagues in allied departments were involved in the work of defining roles and responsibilities, establishing lines of communication,

facilitating access to information, and streamlining common processes. For example in the event that Infection Control identified a patient with a positive tuberculosis test, Workplace Health would be notified to follow up with staff and Public Health would follow up with community contacts. This work relates to NPT sub-constructs that touch on all four NPT domains. Under the domain of coherence it can be seen as communal specification, that is, the development of a shared understanding of the aims and objective of the work. Under cognitive participation it describes enrollment, the engagement of groups in order to contribute to the success of the practice. As collective action it is an example of relational integration – integrating practices that promote trust and accountability in intergroup relations. In this case social relations were used as a starting point to build a system of accountability, information sharing and aid in the streamlining of processes. As a result of this work the OHN group became trusted partners and colleagues rather than a vague entity. Finally there is evidence of positive communal appraisal that the WHCC was a valuable and workable practice.

6.2.5. Information technology services.

The IT system analyst was identified by many participants as a key actor in the project. It is apparent that much of the success of the WHCC hinges on the ability of WHITE to efficiently collect, store, and retrieve data. Having a dedicated IT analyst available to not only quickly remedy issues but also to develop and streamline processes on an ongoing basis was a huge asset and greatly appreciated by participants, as recognized by his unofficial title of “the WHITE knight”. It was very apparent that the presence of the system analyst ensured a positive contribution to the construct of interactional workability — the degree to which a system enables or impedes the work. The fact that WHITE itself was an established and relatively stable system made this work easier.

Organizational support for the project also enabled the department to install a state of the art telephony system, and provide comfortable and efficient workstations for the OHNs, affordances that indicated the organization’s capacity to undertake and support the initiative – further indicators of contextual integration.

6.2.6. Clients.

Clients of the WHCC were also key actors. These include Department and Unit Managers, and individual employees who use the services. While these groups lacked direct formal authority to impact the WHCC they have a degree of political access that could have enabled them to either negatively or positively influence decision makers on the efficacy and value of the service. Unit and Department Managers have the ability to do this through their reporting lines; employees have the option to voice dissatisfaction or concerns to their union representatives and/or their unit managers. Furthermore, organizations always have an effective "grapevine" that can quickly circulate positive or negative opinions about the value and effectiveness of a program. Unfortunately once negative opinions have been formed they are extremely difficult to change so there is great importance in "getting things right" from the beginning.

The communication efforts of the WHCC managers helped these groups to understand the new service, quickly identify any difficulties, and resolve them. Both of these groups quickly recognized the value of the new service and actively supported it. The NPT constructs relevant here are those of coherence or "sense-making" – understanding the aims and objectives of a practice, its value, benefits, and importance, and reflexive monitoring.

6.2.7. Findings.

The study found evidence that the constructs of NPT provide a useful framework to identify the key actors and the specific work of implementation performed by them. In this study key actors were defined as those with the formal or informal power or ability to influence the success of the new practice.

6.3. Research Question 2

The second research question asks "how is the work understood by those involved?" The task of understanding the work begins with the construct of reflexive monitoring. Reflexive monitoring occurs when participants reflect on how useful or effective a new set of practices is, and how the new practice affects them personally.

Individuals ask “does this work for me?” It also occurs when groups collectively ask “is this working for us?” This kind of activity goes on all the time in groups and organizations sometimes in a formal way, but more often, informally. The case study illustrated how the OHNs worked through the process of reflexive monitoring from the initial stages when some decided it didn’t work for them, through the stage of active implementation where they expressed a sense of novelty, curiosity, excitement, and pride at being involved in a new, groundbreaking initiative which received positive results and feedback from employees, managers, and senior management.

Another key factor in success was the sense of legitimization – OHNS felt that the new practice was consistent with their professional roles and expectations and that it enhanced the service they were able to provide. For example, the work of the WHCC was not configured in a way that a traditional call centre might be where workers are expected to respond to calls using narrow and specifically formulated responses. Rather, it was designed to integrate their clinical knowledge and expertise, tacit knowledge, and professional discretion so that it was consistent with their notion of appropriate professional roles and responsibilities. The development of standardized processes and procedures enabled a more focused and effective service while maintaining their professional discretion. The approach was further enhanced by the field service teams, a rotation that provided nurses with the opportunity to interact with clients on a face to face basis. This enabled them to re-affirm their ability to maintain a relational practice with clients that was not mediated.

Several participants expressed the view that the new approach enabled them to “make a difference” – an important value of nursing professionalism. This was particularly true in the handling of blood and body fluid (BBF) exposures. BBF exposures are critical incidents that carry the risk of exposure to potentially infectious diseases (for example, HIV, and Hepatitis C), that may result in the need for medical treatment, absence from work, disruption of family life, and the risk of chronic and possibly fatal disease. For the exposed worker, BBF exposures are emotional and anxiety inducing events. OHNs have an important role to play in counseling and supporting exposed workers, and by expediting and coordinating laboratory results to facilitate treatment if necessary. By streamlining processes the OHNs in the WHCC

were better able to quickly identify exposures, obtain laboratory results, and provide counseling, reassurance, and follow up to employees.

Another successful aspect of the WHCC was the relationship work done with allied professional groups that established the OHNs role in the process of preventing and managing occupational infectious diseases in the health authority. This work enabled the group to demonstrate their effectiveness to senior management: it also established their expertise and credibility with colleagues. Related to this are elements of collective action or "enacting work". Formerly each OHN had her own sphere of practice focused on a particular hospital or employee group. This arrangement did not provide a coordinated service and in the absence of a means of documenting their work it was difficult to demonstrate their value to the health authority. The new model of practice streamlined, focused, and synthesized work (in the form of statistics) that previously had been unorganized and less effective. In this way they were able to demonstrate the integration of the service with the overall goals and structure of the organization.

6.3.1. Findings.

In this study NPT provided a useful way to conceptualize how participants understood the new practice. This understanding appeared to have a direct effect on their willingness to participate and the actions they were prepared to take to support the new initiative. The construct of reflexive monitoring appeared to be particularly applicable in this determination as participants monitored their involvement over time and adjusted their behaviours.

6.4. Research Question 3

The final research question asks "does NPT accurately identify the factors that lead to normalization?"

6.4.1. Findings

As described in the case study analysis, when the perspectives of nurses and those associated with the implementation of the WHCC were compared to the four NPT construct areas of sense-making, participation, action, and reflexive monitoring a strong positive association with both the constructs and construct sub-categories could be identified. This observation suggests that NPT is useful in identifying certain key factors that appear to predispose to successful normalization and, as such, it has utility as an analytic framework. However as a small case study of a limited and very specific intervention it is not possible to generalize the findings of this study to assert that NPT can accurately identify all factors that lead to normalization. There were two areas where NPT did not perform well.

For example, it was apparent that WHITE was a significant factor in the success of the WHCC. If WHITE had not been a successful and configurable platform with excellent technical support it is unlikely the WHCC could have been so successful. Yet, NPT focuses on human agency and does not formally acknowledge the agency of non-human artifacts. It relies instead on the construct of contextual integration to describe the "will and capacity of the organization" to support an initiative. This is problematic for two reasons. Firstly, organizational will is an anthropomorphic construct and as such rather vague and difficult to assess. Secondly this construct does not address the actual capabilities of an ICT. It could be possible that the organization is using it's capacity to support an inadequate system and, in fact, the literature provides many examples of this. Since complex interventions are conceptualized as socio technical assemblages NPT appears to fall short by not recognizing the influence of the technical.

It is apparent that the concept of normalization itself is somewhat problematic. It is not clear at what point it can be decided that an implementation has been normalized. As described in the case study it was apparent that the new practice was in a state of continuous evolution from the time the OHNs decided that a different model of practice was required. Certainly it seems very unlikely that the OHNs would now return to their old way of practicing, and in that sense it could be said that the call centre approach had become their normal way of working. However it is also evident that as a result of learning processes, and building on their success, the WHCC will continue to evolve.

For example, since the end of the study period the service has expanded to include all health care workers in the province, and there are plans to expand the range of services offered to possibly include health promotion and health coaching activities. The call centre itself may evolve with changes in ICTs that allow the OHNs to communicate face-to-face, perhaps via teleconferencing, or to telecommute from home. It may well be that it is change that is the "normal" for this workgroup and there will never be a static end point where the work of implementation is complete and can be declared normalized. This situation is likely to be very common in dynamic environments. In the final section I propose this as a possible area for future research.

7. Limitations, Future Research and Conclusion

7.1. Limitations of the Study

All research studies have limiting factors arising from the topic, the research design and methods, and the theoretical approaches used. While NPT has been used in the assessment of many health care implementations the topic of this study, occupational health nursing practice, has not been previously researched from a socio-technical perspective. In addition the unique nature of OHN practice generally (as discussed in Chapter 4), and the unique nature of the intervention itself, means that there are no other existing studies that could be used to correlate or triangulate the findings of this research and therefore the findings must be considered exploratory and preliminary at this stage.

Due to the unique nature of the intervention under study a single case study approach seemed to be the most appropriate research design. However, single case study approaches have some inherent limitations and require certain steps to ensure quality and trustworthiness (Yin, 2003). For example Yin notes that to ensure construct validity it is important to use multiple sources of evidence in order to establish a chain of evidence. To comply with this requirement I used a variety of sources including participant interviews, documents, and field notes of direct observations. Key informants were used to check the accuracy of facts and statements made in the case study description. In this way a sufficient level of detail could be assembled and used for triangulation. A possible weakness of this study arose from the constraints of confidentiality, and the terms of my ethical approval, in that I did not have access to participants outside of the WHCC who may have had alternative perspectives on its development, effectiveness, and success. To offset this bias I used triangulation of documentary evidence and reports of key informants. However, while organizational documents do provide external context it must be understood that their content is filtered

in a way that face-to-face interviews may not be, and key informants can only provide evidence from their own personal perspectives.

Secondly, Yin insists that case study validity can be enhanced by the use of theory and that the use of theory aids in generalizing the findings to other situations. A possible weakness of this study arises from the lack of detail inherent in the NPT constructs. I attempted to mitigate this disadvantage by applying the framework method, developing and documenting a thematic chart, and using a double coding technique however, these kinds of coding decisions point out the limitations of being a single researcher. The availability of (a) co-investigator(s) to debate coding assignments would increase the precision and validity of coding categories.

Yin's final test for case studies involves ensuring that the study contains sufficient procedural detail such that a later investigator could repeat the same study. I have attempted to provide as much detail as possible in this regard by documenting my procedures and techniques.

7.2. Future Research

This study traced the development of the WHCC only to the point where it was extended to other health authorities in the province. Further research might include extending the study to examine the success or failure of the model of practice after the expanded application. In the expanded service the calls will continue to be handled by staff in the central office; however the field service delivery component will be the responsibility of the individual health authorities. In these areas capabilities and delivery methods vary considerably due to local resource levels, and geographical distances. In addition, a different organizational culture exists in other health authorities that may resent this external intrusion and fail to provide the same level of organizational support. Could the NPT constructs be used to identify the specific elements of the expanded program that require special consideration or modification?

It would also be useful to revisit the original study site at a later time to follow up with participants and any newcomers to the department in order to query the applicability of NPT for ongoing program evaluation. Will newcomers continue to be attracted by the

novelty of the new practice? Will existing staff remain engaged or will they become bored when the “new normal” becomes routine? Could NPT be used to anticipate and mitigate these developments?

Several authors (for example; Murray et al., 2010; Tabak et al, 2012) have insisted that NPT could, and should, be used prospectively. Moving forward, the NPT constructs should be tested at the design and planning stages of complex interventions to determine how they can be used to facilitate implementation. In addition, long before implementation occurs the NPT constructs should be tested at the design stage of new technologies – can the constructs be applied to prevent the unfortunate “failure to launch” phenomenon commonly seen after time, money, and effort have been spent on technology research and development? Used in this way the NPT constructs could also be used to identify and evaluate potential markets for innovations; to assess the readiness for technological change; or to position new devices, procedures, and methods in the marketplace.

In conducting the study it became apparent that the constructs and terminology of NPT could benefit from further research and refinement. As noted in the research findings the current definition of normalization is somewhat vague, difficult to apply, and lacking in context. Is normalization a final state or a moving target? At what point can a new practice be considered normalized in a certain context, and how could this be described using qualitative or quantitative methods? In addition to improved outcome measures, further refinement and definition of the NPT constructs themselves would improve their sensitivity and make them easier to apply and replicate. For example MacFarlane and O’Reilly-deBrun (2012) suggest developing study specific meanings for the constructs.

NPT has significance for future research in occupational health nursing practice. As I outlined in Chapter 1, my motivation for the study arose from curiosity about the actual work of change and my frustration as an occupational health nurse in bringing about change to improve health and safety in the workplace. Much of what nurses and occupational health nurses in particular do is invisible work. The findings of this study illustrate NPTs utility in indentifying and visualizing the agentic contribution of OHNs and their contributions in bringing about change and making a new practice successful. In

this way NPT provides a dynamic model for implementation research in other occupational health nursing practice settings.

7.3. NPT as a Framework for Implementation

It is possible to envision combining the ideas put forth in the socio-technical information network (STIN) and the NPT constructs to develop a framework that could be applied to the implementation of a new initiative. This would begin with the STIN process of examining the context of the proposed implementation by identifying the stakeholders and the core interactor groups who will be affected, identify excluded groups, incentive structures and resource flows. This analysis can then be used to undertake an assessment, informed by NPT, to gauge the likelihood that the intervention will be successful. For example, is the intervention easy to describe (coherence)? Are target groups likely to think the intervention is a good idea (cognitive participation)? How will the intervention affect the work of user groups, will it make their work easier or more difficult (collective action)? And finally how are users likely to evaluate the intervention (reflexive monitoring)?

7.4. Conclusion

The findings of this study illustrate the utility of NPT in understanding the social dynamics involved in the successful implementation of a complex intervention. Further, I believe this study also highlights the importance of taking a broader view of technology. As discussed in Chapter 2, the technology described by NPT is the "technology of practice", that is, the work of getting things done — the work of making sense of new practices; the relational work involved in making a system function; the operational work needed to build and sustain the practice; and the appraisal work that, in many cases, ultimately determines the success or failure of the implementation. In this way NPT is a valuable tool that provides ways to think about, and assess, the intrinsic workability of a practice, something that is often overlooked in the face of organizational imperatives and new information and communication technologies.

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Appendices

Appendix A.

Construct Definitions:

1. Coherence is the sense making work that people do individually and collectively when they are faced with the problem of operationalizing some set of practices. It includes the sub-constructs of:

- C1: differentiation - understanding how a set of practices and the objects are different from each other. Is there a clear understanding of how a new service differs from existing practice;
- C2: communal specification - a shared understanding of the aims objectives and expected benefits of a set of practices;
- C3: individual specification - how participants understand their specific tasks and responsibilities around a set of practices and;
- C4: internalization - how people understand the value, benefits and importance of a set of practices.

2. Cognitive participation is the relational work that people do to build and sustain a community of practice around a new technology or complex intervention and their commitment to making the system work. It includes:

- CP1: initiation - the involvement and willingness of key participants to drive the implementation forward.
- CP2: enrolment - the organization or re-organization of groups in order to contribute to the work of the practice: do individuals “buy in” to the implementation?
- CP3: legitimation - the sense that participants have that it is right for them to be involved in the new practice;
- CP4: activation - participants need to collectively define the actions and procedures needed to sustain a practice and to stay involved.

3. Collective action is the operational work that people do to enact a set of practices, technology or other complex intervention during the enactment stage of an intervention.

- CA1: interactional workability - the interactional work that people do with each other, with artefacts, and with other elements of a set of practices; the degree to which an e health system enables or impedes the work of interactions between health professional and patients. Does the implementation make people’s work easier? (Finch, 2012)

- CA2: relational integration - the knowledge work that people do to build accountability and maintain confidence in a set of practices and in each other as they use them; The way in which different professional groups relate to each other and how well the proposed ehealth initiative fits or integrates with existing relationships as well as the degree to which it promotes trust accountability and responsibility in inter group relationships. (Finch 2012)
- CA3: skill set workability - the allocation work that underpins the division of labour around a set of practices (who gets to do the work); The degree to which the ehealth initiative fits with existing working practices, skill sets and perceived job role. (Finch 2012)
- CA4: contextual integration - the allocation of resources in order to execute new technologies or complex interventions in practice; the degree to which the proposed ehealth system fits or integrates with the overall goals and structure of the organization (context) as well as the capacity of the organization to undertake the implementation. Organizational support.(Finch 2012)

4. Reflexive monitoring is the appraisal work that people do to assess and understand the ways that a new set of practices affect them and others around them. It includes ongoing mechanisms for monitoring and appraising how the system is used:

- RM1: systematization - an assessment of how effective and useful a new set of practices is (formal or informal systematization). How are benefits or problems identified or measured?
- RM2: communal appraisal - e.g. the work groups' appraisal - is it working? Can be a formal or informal process;
- RM3: individual appraisal – how do individuals assess how the new practice affects them and their work environment.
- RM4: reconfiguration – do individuals or work groups attempt to alter the new service to redefine procedures, modify practices or reshape technologies that have been introduced, for example, introduce workarounds.

(Definitions are taken from May et al., 2010; Finch et al. 2012; Mair et al. 2012)

Appendix B.

Invitation to Participate

SFU
School of Communication
8888 University Drive
Burnaby, British Columbia
Canada V5A 1S6

www.cmns.sfu.ca
Tel. 778-782-3687
Fax 778-782-4024

Date: June, 2012

An Invitation to Participate in the Study: Understanding the Work of Telehealth Implementation Using Normalization Process Theory

Abstract

Anyone who has tried to introduce a new policy, procedure, or technology in an organization knows that orchestrating successful change is a difficult process. This project studies the human dynamics involved in technological change and the routine embedding of practice. The research applies Normalization Process Theory (NPT) as described by May et al. (2010). NPT is based on the idea that there is specific work that defines and organizes complex interventions (combinations of policies, procedures and technologies) and it seeks to understand: what is the work, who does this work, how does this work get done, and how is the work understood by those involved? How do new ways of thinking, acting and organizing become embedded in everyday work activity so that they become the normal way of working? In order to explore these questions this study will examine the work of actors that defines and organizes the enacting of complex interventions - processes, policies, and devices ("technologies") in various health care settings.

What's Involved?

Participation in this study involves a confidential interview (about 45 minutes) concerning your involvement with the Workplace Health Call Centre. This interview will be conducted by Janet Morrison and will take place in a location that is most comfortable and convenient to you. You will be asked to sign a consent form which outlines the study purposes and methods. The interview will be recorded and then transcribed. All information that identifies you personally will be removed. In a follow up meeting (about 15 minutes) you will have the opportunity to review the transcript of the interview and make any changes you wish. You may leave the study at any time.

This study is part of Janet Morrison's doctoral research at Simon Fraser University and will contribute to her dissertation. If you would like to participate, or have further questions, please contact her directly at:

Thank You!

Appendix C.

Informed Consent

Subject Information and Consent Form

Understanding the Work of Telehealth Implementation Using Normalization Process Theory

Principal Investigator: Dr. Richard Smith, MA, PhD
Professor, School of Communications, Simon Fraser University
[redacted]

Co-Investigator/External Janet Morrison, RN, MA, MLIS, COHN(C)
Doctoral Candidate, School of Communications, SFU
[redacted]

Co-investigator/Internal Dave Keen
Executive Director, Workplace Health
Fraser Health Authority and Provincial Health Services Authority
[redacted]

Introduction

You are being invited to take part in this research study because you have had experience with the development, implementation and operation of a unique and innovative occupational health telehealth system: the Workplace Health Call Centre.

Participation

Your participation is entirely voluntary, so it is up to you to decide whether or not to take part in this study. Before you decide, it is important for you to understand what the research involves. This consent form will tell you about the study, why the research is being done what will happen during the study.

If you wish to participate you will be asked to sign this form. If you do decide to take part in this study, you are still free to withdraw at any time and without giving any reasons for

Fraser Health Authority
Workplace Health
#400-13450 102nd Ave.
Surrey BC
V3T 0H1 Canada
www.fraserhealth.ca

your decision. If you do not wish to participate, you do not have to provide any reason for your decision.

Please take time to read the following information carefully. If you have any questions about the study please contact either the Principal Investigator or Co-Investigators at the above contact addresses.

Who Is Conducting The Study?

This is an unfunded study conducted by Janet Morrison as part of her doctoral dissertation research at Simon Fraser University School of Communications. Permission to conduct this study has been granted by the Fraser Health Authority.

Background

Anyone who has tried to introduce a new policy, procedure or technology in an organization knows that orchestrating successful change is a difficult process. This project studies the human dynamics involved in technological change and the routine embedding of practice. The research applies Normalization Process Theory (NPT) as described by May et al. (2010). NPT is based on the idea that there is specific work that defines and organizes complex interventions (combinations of policies, procedures and technologies) and it seeks to understand: what is the work, who does this work, how does this work get done, and how is the work understood by those involved? How do new ways of thinking, acting and organizing become embedded in everyday work activity so that they become the normal way of working?

What Is The Purpose of the Study?

The goal of this study is to contribute to theory by testing the power of NPT to explain the normalization of complex interventions. While many telehealth projects have failed, why has the Workplace Health Call Centre been a success? Specifically, what actions have contributed to this success? Will it continue to be a success when it is introduced to other health authorities?

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Who Can Participate In The Study?

Anyone who has had direct experience in the development, implementation and operation of the Workplace Health Call Centre is eligible to participate.

Who Should Not Participate In The Study?

Those who have not had direct experience in the development, implementation and operation of the Workplace Health Call Centre are ineligible to participate.

What Does The Study Involve?

Your participation in the study involves an interview of approximately 45 minutes concerning your experiences in the development, implementation and operation of the Call Centre. This interview will be conducted by the PI/Designate in person away from the workplace at a location convenient to you. With your permission, the interview will be audio recorded to facilitate collection of information and later transcribed for analysis. Shortly after the interview has been completed you will have the opportunity to review a copy of the transcript to confirm the accuracy of the conversation and to add, remove, or clarify any points that you wish. This second meeting will take about 15 minutes.

What happens If I Decide To Withdraw My Consent To Participate?

Your participation in this study is entirely voluntary. You may withdraw from the study at any time and no explanation of your decision to withdraw will be required. If you choose to enter the study and then decide to withdraw at a later time, all data collected from you during your enrolment in the study will be destroyed. You may decline to answer any interview questions and you may delete, revise or clarify any of your transcribed statements at any time. Your refusal to participate or withdrawal after agreeing to participate will have no adverse effects on your employment or evaluation at the workplace.

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#400-13450 102nd Ave.
Surrey BC
V3T 0H1 Canada
www.fraserhealth.ca

How Will My Taking Part in This Study Be Kept Confidential?

Your confidentiality will be respected. However, research records and health or other source records identifying you may be inspected in the presence of the Investigator or his or her designate by representatives of the Fraser Health Research Ethics Board for the purpose of monitoring the research. No information or records that disclose your identity will be published without your consent, nor will any information or records that disclose your identity be removed or released without your consent unless required by law.

You will be assigned a unique study number as a subject in this study. Only this number will be used on any research-related information collected from you during the course of this study, so that your identity [i.e. your name or any other information that contains clues to your identity] as a subject in this study will be kept confidential. Your name will not appear in any thesis or report resulting from this study. Information that contains your identity will remain only with the Principal Investigator and/or Co-Investigator/External.

What Are The Possible Risks of Participating?

No physical or psychological risks associated with the study have been identified. The researchers will take every measure possible to ensure subject confidentiality by ensuring that all data has identifying information removed. However, since Workplace Health is a relatively small working group and its membership is a matter of public record, it may not be possible to ensure that subject anonymity can be maintained - that is, it may be known or suspected by others that you participated in the project, however, the substance and nature of your participation will remain confidential.

What Are The Benefits Of Participating In The Study?

No one knows whether or not you will benefit from this study. There may or may not be direct benefits to you from taking part in this study. We hope that the information learned from this study can contribute to the understanding of successful technological change in health services delivery by testing Normalization Process Theory. This is an unfunded study and no remuneration is offered for participation.

Fraser Health Authority
Workplace Health

#400-13450 102nd Ave.
Surrey BC
V3T 0H1 Canada

www.fraserhealth.ca

Who Do I Contact If I Have Questions About The Study During My Participation?

If you have any questions or desire further information about the study before or during participation you can contact the Principal Investigator (Dr. Richard Smith at [redacted] or Dr. Hal Weinberg, Director, Office of Research Ethics, Simon Fraser University at [redacted], email: [redacted]

If you have any concerns or complaints about your rights as a research subject and/or your experiences while participating in this study you may discuss these rights with the co-chairmen of the Fraser Health REB: Dr. Anton Grunfeld or Dr. Allan Belzberg, Fraser Health Authority Research Ethics Board. Call: 604-587-4681.

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Consent Form

Understanding the Work of Telehealth Implementation Using Normalization Process Theory

My signature on this form indicates:

- *I have read and understood the subject information and consent form and am consenting to participate in this study.*
- *I have had sufficient time to consider the information provided and to ask for advice if necessary.*
- *I have had the opportunity to ask questions and have had satisfactory responses to my questions.*
- *I understand that all of the information collected will be kept confidential and that the result will only be used for the objectives of this study.*
- *I understand that my participation in this study is voluntary and that I am completely free to refuse to participate or to withdraw from this study at any time.*
- *I understand that I am not waiving any of my legal rights as a result of signing this consent form.*
- *I understand that I will receive no remuneration for participating in this study.*
- *I have read this form and I freely consent to participate in this study.*
- *I have been told that I will receive a dated and signed copy of this form.*

SIGNATURES

Printed Name of Subject	Signature	Date
Printed Name of Person Obtaining Consent	Signature	Date

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Appendix D.

Interview Script - sample interview questions

1. Questions relating to coherence or sense making work

- How long have you worked at/been involved with the WHCC? How is this work different or the same as your other OHN experience?
- How does/doesn't the WHCC meet the aims and objectives of the department from your perspective?
- To what extent do you think the WHCC meets the needs of clients (the organization)?
- As an OHN does this meet your personal standards of practice? Would you recommend this sort of practice to other OHNs?

2. Questions relating to cognitive participation – the relational work that people do to build and sustain a community of practice around a new technology or complex intervention.

- How did you come to be involved with the WHCC?
- Did you need any special training (if so what kind) of training did you receive to work in the WHCC, how did this done?
- Was working in the WHCC a big learning curve at first (how so or not), how did you manage your learning, who/what helped you?
- Do other OHNs working in the WHCC share their learning with others in the group? How is this done?
- Do you think the work in the WHCC compliments your existing OHN skills; did it require you to learn new skills (what skills)?

3. Questions relating to collective action – operational work that people do to enact a set of practices, technology or other complex interventions.

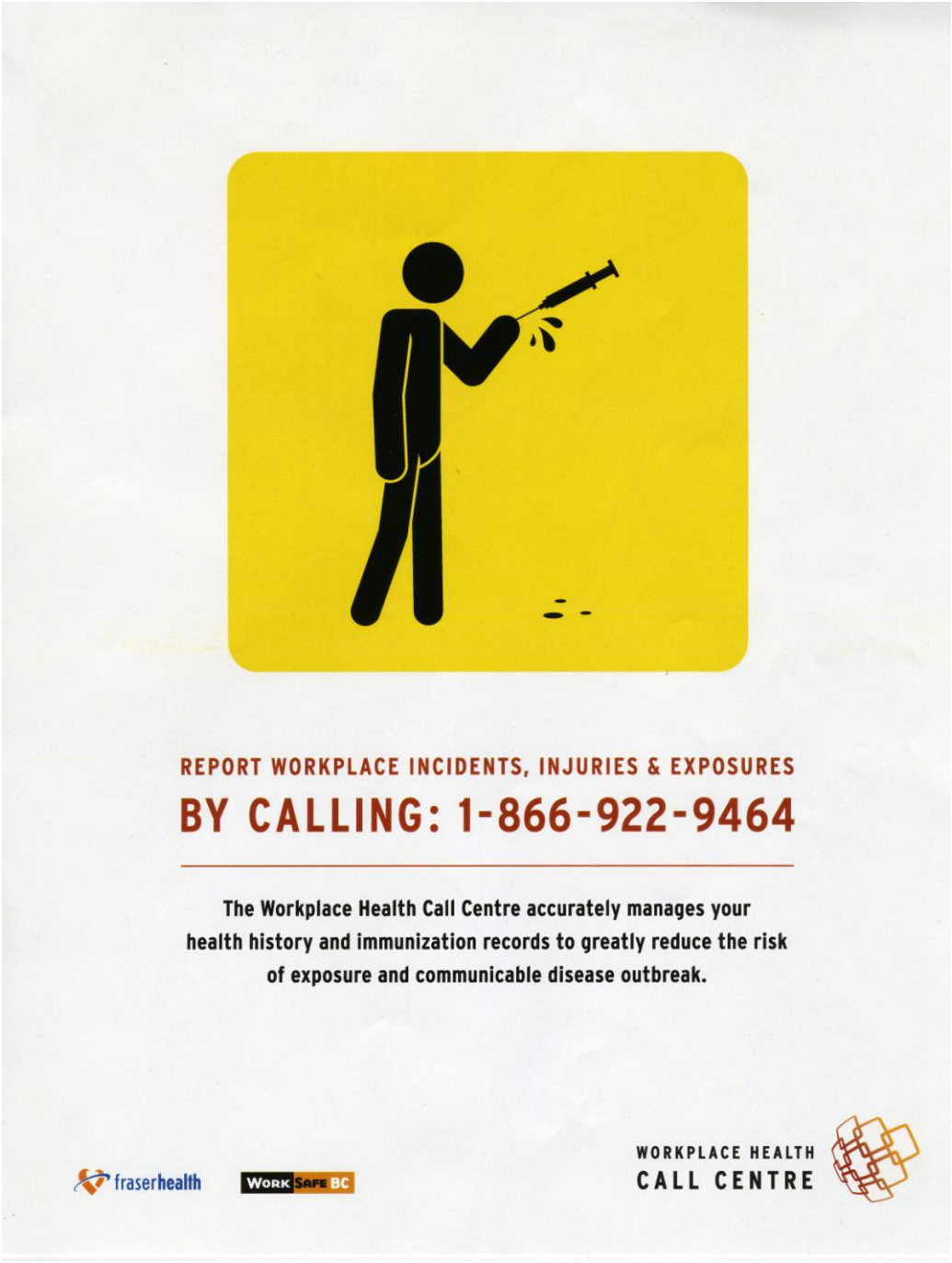
- How easy/difficult is it/was it to learn/use WHITE?
- Do you have confidence in WHITE as a system – is the data accurate, secure, useful?
- From your perspective, how did the WHCC come about?
- How were you involved in developing the WHCC? Who else contributed?

4. Questions relating to reflexive monitoring – the appraisal work to assess and understand the ways that a new set of practice affect them and others around them.

- How effective is the WHCC in meeting the service needs of clients, and the organization? Does it work (in what way(s) or not)?
- When using WHITE are workarounds necessary to get things done?
- Have there been modifications to WHITE – what changed, who was involved?
- Has the WHCC been formally or informally evaluated – will/should it be?
- Has working in the WHCC been a positive experience for you personally? As an OHN?

Appendix E.

Advertising the WHCC – Poster



WORKPLACE HEALTH
CALL CENTRE

Suite 400, Central City Tower 13450 – 102nd Avenue, Surrey, BC V3T 1H(

Workplace Health Call Centre (WHCC) - Occupational Health Nursing (OHN)

Health care workers and first responders are at risk of acquiring communicable diseases within the workplace. Common exposures include: measles, mumps, rubella, chicken pox, pertussis, hepatitis B, tetanus, diphtheria, tuberculosis and norovirus. Worker infections can also be transmitted to patients, clients, residents, colleagues, community contacts and family members.

The WHCC offers timely occupational health services that assist workers and employers in the: a) management of exposures, including blood or body fluid and communicable disease, and b) efficient collection of health history information.

Blood or Body Fluid (BBF) Exposure

Common Issue
Workers involved in a BBF exposure are often concerned about HIV or Hepatitis B, C.

Call Centre Service
- The WHCC provides seamless integration between reporting the exposure and follow up. Over the phone, an occupational health nurse guides the worker by providing post-exposure follow-up management. Advice is given to the worker based on evidence-based best practices.
- The health employer has access to reports that enable the identification BBF exposure incident trends.

Communicable Disease Exposure

Common Issue
Workers involved in a potential exposure need an easy way to report an incident; otherwise the incident can go unreported resulting in risks that are not managed correctly. Workers are also frequently concerned about taking a communicable disease home to their family. When an exposure has occurred it is critical to assist workers in: a) determining whether the incident meets the definition of an exposure, which is unique for each disease, and b) confirming the appropriate next steps.

Call Centre Service
- The worker reports a potential exposure by phone to the WHCC.
- The WHCC model supports a population-based response to Occupational Health and can manage multiple communicable disease exposures at one time across all sites.
- The WHCC has surge capacity – it can easily ramp up during major outbreaks such as pandemic influenza and then reduce when the threat has passed.
- Immunity records and exposures are managed.

Health Histories for New Workers

Common Issue
Traditional methods of gathering worker health histories through forms is time consuming and is often recorded inconsistently. In many cases, forms are not returned.

Call Centre Service
- New workers contact the call centre within two weeks of hire.
- Live health history information is entered during a phone call with the new hire (based on up-to-date provincial and national guidelines). No paper forms are needed. The process is faster, quicker, and easier than completing a form and it can be completed from home or from work in a confidential call.
- Confirmation of health information and recommended vaccines are emailed to the new hire. Workers are directed to on-site immunization services, as needed. Workers are encouraged to keep personal health and immunity records up-to-date.

Appendix F

Results