Privacy, Dignity, and Integrity: A Material Culture Analysis of What Space and Technology Affords the Neonatal Nurse

by

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Abstract

Despite a large and ever-growing body of literature that is concerned with the relationship between the neonatal nurse and the physical environment of her workplace, particularly as knowledge that can inform the design of NICUs, there is very little work that looks to understand how the neonatal nurse experiences the particular objects and spaces of her work environment. Taking a material culture studies approach to the study of one intensive care unit in Edmonton, Alberta, Canada, this research describes how nurses working within this site interact with, perceive, and describe two everyday technological objects (the Overhead Warmer and the Hokki Stool) and one space (Pod 1) in the NICU. Based on an analysis of data collected through an artifact analysis, observations, and interviews, this thesis tells the story of how nurses need and value privacy, dignity, and integrity in their work, and how these experiences are afforded through their interaction with this space and these objects. The findings of this research have implications for the design and development of the NICU and NICU design related products, as well as being a contribution to scholarship related to the material culture of nursing, and the material culture of work.

This thesis is an original work by Paz Orellana-Fitzgerald. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, Project Name “THE MATERIAL/SPATIAL NICU ENVIRONMENT: NURSE INTERACTIONS, PERCEPTIONS, AND CONCEPTIONS”, No. Pro00055189, JULY 16, 2015.

I dedicate this work to Avi and Tico.

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Lastly, I would like to thank my family and friends for their love and support through this journey. In particular, I would like to thank my husband, Brendan and my son Gabriel, without whose daily love and encouragement I would not have succeeded. I hope I've made you proud.

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Chapter 1: Introduction

The neonatal intensive care unit (NICU) is an inpatient unit that provides newborns with medical care related to such issues as prematurity, congenital anomalies, and transitional problems. It is an environment made up of people, objects and spaces. The primary inhabitants of the NICU are the infants, their families, and staff such as nurses, nurse practitioners, neonatologists, pharmacists, dieticians, respiratory specialists, clerks, maintenance workers, etc. Typical NICU objects and spaces include any combination of charts, computers, tools, monitors, incubators, medicines, curtains, whiteboards, chairs, cots, desks, fixtures, diapers, blankets, hallways, patient rooms, staff rooms, storage rooms, offices, etc.

The amalgam of people, objects and spaces that comprise the NICU is precisely what the research presented in this thesis is concerned with. This thesis shows how (selected) objects and spaces of the environment, and in particular the NICU environment, are not simply utilitarian. They do more than make life easier and are more than just useful. Objects and spaces are meaningful, and those of the NICU are no exception.

The research presented in this thesis is the study of the material culture, or object/human relations, of one neonatal intensive care unit in Edmonton, Alberta, Canada. It describes how nurses working within this site interact with, perceive, and describe two everyday objects of technology (the Overhead Warmer and the Hokki Stool) and one space (Pod 1) in the NICU. Based on qualitative data and its analysis, this research tells the story of how the nurses need and value privacy, dignity, and integrity in their work, and how these experiences are afforded through their interactions with this space and these objects.

In this first chapter, I introduce the study I undertook for this thesis. I provide some context to the study, state the problem and the research questions, and discuss the purpose and objectives of the study, as well as its assumptions and significance. I end the chapter with a brief introduction of myself, the researcher, along with an outline summary of the document as a whole.

Some Context

The design of the NICU has evolved from an environment intended solely to provide optimal medical care and technology to the newborn, to one that acknowledges the role of the environment on not only the infant, but also the infant's family and caregivers (White, 2011). Advances in neonatology, technology, and the assumption of family-integrated (O'Brien et al., 2013) and developmental (Als, 1982) philosophies of care have produced the contemporary NICU, a highly specialized clinical environment whose material/spatial landscape is designed to simultaneously sustain the neurodevelopmental growth of the neonate; support the professional, administrative, and personal goals of the staff; as well as to provide families the privacy and space in which to care for their infant (Shepley, 2004; White, 2004; White, Smith & Shepley, 2013).

The NICU is a complex environment that must attend to the, often conflicting, needs of the infant, parents, and staff that live and/or work in it. The physical environment of the hospital has the potential to negatively, and/or positively impact, the health, safety, and wellbeing of patients, family members, and staff (Zimring, Joseph, & Choudhary, 2004). In regards to caregivers, the design of the hospital environment can improve staff health and safety, increase staff effectiveness, reduce errors, and increase staff satisfaction (Ulrich, Zimring, Zhu, DuBose, Seo, Choi, Quan, & Joseph, 2008). An efficient, healthy, safe, and satisfying neonatal practice, and hence the health of the neonate and the satisfaction of the parent, is contingent (in part) on the material/spatial NICU environment supporting the needs and goals of the nurse.

The neonatal nurse plays a pivotal role in the family–integrated and developmental care of the neonate, playing the role of teacher, guardian and facilitator (Reis, Rempel, Scott, Brady-Fryer, & Van Aerde, 2010) to the families of newborns in the NICU. Reis et al. (2010) argue that the relationship that is developed with the bedside nurse can be the most significant factor affecting parent satisfaction with the NICU experience, and hence patient outcomes.

Neonatal nursing can be an extremely stressful job, with nurse burnout and stress having a negative effect on patient safety, staff satisfaction and retention, and on the personal health and wellbeing of the nurse (Braithwaite, 2008).

The experience of the nurse is very much sought after in both the nursing and NICU design research literature. An understanding of the experience of nursing is important to the development and improvement of not only nursing practice and policies, but also of the designed environments nurses work in (Zborowsky, 2014). The voice of the neonatal nurse is regarded as valuable and necessary to the design and development of NICUs and NICU related products (Clark, 2014). Lindseth and Norberg (2004) state that an understanding of the experience of nursing is an opportunity for nursing, as a profession, to reflect on "the meaning of healthcare as it manifests itself in many actions, activities, considerations, helping measures, institutions, buildings, technologies, and so on" (p.148).

The Research Problem and Questions

Despite a large and ever-growing body of literature that is concerned with the relationship between neonatal nurses and the physical environment of their workplace, particularly as knowledge that can inform the design of NICUs, there is very little work that looks to understand how the neonatal nurses experience the particular objects and spaces of their work environment. Very few studies actually look to the everyday objects and spaces of the NICU itself, as a source of knowledge and meaning; as they are perceived, encountered, used, modified, avoided and adapted by nurses.

The main research question for this project is: How do NICU nurses experience the material/spatial environment of their workplace? Subsequent questions include: How do they interact with specific objects and spaces within the NICU? How have they modified the environment in order to make it work for them? What objects and spaces in the NICU are significant to them, and why?

The Research Purpose and Objectives

The purpose of this research was, first and foremost, to explore how neonatal nurses working at the Grey Nuns Hospital in Edmonton, Alberta experience the material/spatial environment of the NICU. A second purpose was to better understand the values, needs, wants, and desires of the nurses in relation to the designed NICU environment.

In accordance with the purpose of this study, the following objectives were established:

- to observe and describe the material/spatial environment of the NICU;
- to observe and describe how nurses deal with, react to, modify, and adapt to the material/spatial environment of the NICU;
- to observe and interpret the problems the nurses are solving through their interaction with the material/spatial NICU environment;
- to listen to and observe how the nurses feel about particular objects, devices, structures, and spaces within the NICU: and,
- to listen to and describe how the nurses imagine their ideal NICU environment.

Assumptions

This research assumed that:

- The objects /spaces in the NICU have an effect on the wellbeing, organization, communication, and behaviour of the nurses working in it; and that the nurses use, adapt, and react to the designed objects and spaces of the NICU in order to fulfill needs, wants, desires, and expectations.
- The objects and spaces of the NICU, themselves, are revealing of values, problem-solving practices, and the desire to fulfill needs.

- The nurses' descriptions of their actual and hypothetical (ideal) NICU environments are indicative of needs, values, desires, and expectations.
- The nurses working in the NICU have the best interests of the neonate and their families in mind, as per family-integrated and developmental philosophies of care.

Significance

This study comes at a time when many organizations both public and private, and in all industries and sectors, are beginning to understand the significance of, and the business case for, employee health and wellness strategies (Willis Towers Watson, 2016). A physically, mentally, and emotionally healthy employee is thought to be more productive and engaged (Miller, 2016). A workplace that promotes the health and wellness of the employees is understood to be attractive to potential employees, as well as a major factor in employee retention (Earle, 2003). The physical environment of the workplace, as well, is stated as playing an important role in the promotion, as well as the impediment, of employee health and wellness, and hence employee productivity and engagement (Craig & Bridges, 2015; Vischer & Wifi, 2017).

Healthcare organizations, in particular, are seeking knowledge that might contribute to the successful and appropriate design and development of health care environments for patients, staff, and families (Becker & Parsons, 2007; Ulrich, et al., 2008). In particular, there is an acknowledgement of the need to provide staff, and specifically nurses, with a work environment that supports their health and wellness, and by default the hospital's clinical and organizational goals (Altimier, 2004; Registered Nurses of Ontario, 2008). An understanding of the needs and values of the worker, and in this case the nurse, is valuable information for the design and development of sustainable and supportive workspaces and products (Shepley, 2004).

This study is further significant in that it contributes to the scholarship around the material culture of work, and even more importantly, the limited scholarship around the material culture of nursing. Specifically, the findings of this study shed light on particular experiences of neonatal nursing and on the role the objects and spaces of the NICU environment play in shaping these. Insights into this relationship have the potential to inform and inspire, not only the future design and development of supportive NICUs and/or NICU related products, but also other work environments, products, and organizational strategies.

About the Researcher

I became a designer because I wanted to make things and because I knew that 'things' were more than just 'things'. I understood that objects and the physical environment could help to make life better or worse, and that they could hold the power to evoke emotion and impact behaviour. I wanted to explore the power of objects and use it to make the world a better place, be that a more comfortable, less confusing, and/or joyful one. I decided to pursue a graduate degree when I realized that I wanted to play a different role in the design process other than the maker. I aspired to learn how to become a better and more empathic designer, to learn what questions to ask and how best to ask them. I am surprised to find myself doing research in an NICU as my thesis project. I am not a nurse, nor have I worked or designed in the area of health. But when the opportunity arose, I jumped on it, although with some trepidation.

More than a designer and aspiring researcher, I am a mother to two children; one that is alive, Gabriel, and one that is not, Aveline. With Gabriel my pregnancy was considered high risk (for preterm delivery) and I was hospitalized at 21 weeks gestation. I lived in the Royal Alexandra Women's Pavilion for 11 weeks before I was sent back to the Grey Nuns Maternity Unit and then home. Gabriel was induced at 40 weeks and has been a happy and healthy boy all his life. My second child, Aveline, was born preterm and died shortly after her birth. Like Gabriel, she never made it to the NICU, but under less joyous circumstances. The NICU is of

interest to me not because I have experienced it as a mother, but because I feel I have narrowly missed it, with both my children.

I feel I am coming to this research wearing several 'hats'. I come as a designer who wants to help make the world a better place to live in, as a design researcher who is fascinated by people and their relationship to their environments, as a patient who has personally experienced the effect of the physical environment on health and wellbeing, and as a mother who feels indebted to the many nurses who cared for me and my children at our most vulnerable. I feel very lucky to have conducted thesis research that I find personally, professionally, and academically fulfilling.

Thesis Outline

This research study is presented in seven chapters. The chapters flow from a background of theoretical context and significant literature, to the methodology used for data collection, to the data collected relating how nurses experience particular NICU objects and spaces, to a discussion of the findings, and a final concluding chapter. This first chapter, as previously stated, includes the background of the study, the statement of the problem and the research questions, the purpose and objectives of the study, the assumptions and significance of the study, as well as a brief introduction to myself.

Chapter 2 presents the theories and concepts and that inform this work as well as a review of the existing literature. This includes definitions of material culture and material culture studies, a brief discussion of the intersection of material culture studies and design, along with a quick introduction to affordance theory and its relation to design and this research, and finally, a discussion around the current state of NICU design and design research, as it relates to the nurse's experience of the physical environment. The following chapter, Chapter 3, describes the methodology used for this research study. It includes the research design and approach, data sources, sampling & recruitment, data collection

methods, data types and management, data analysis procedures, issues of reliability and validity, and ethical considerations.

Chapters 4 and 5 present the study's findings. Chapter 4 provides a rich description of the relationship between the nurses and a particular space in the NICU—Pod 1. In it I describe how the nurses use the space, what it affords the nurse (privacy), as well as the qualities and character that affords this. Chapter 5 turns attention to two technological artifacts, or objects, in the NICU: the Overhead Warmer and the Hokki Stool. The Overhead Warmer is described as affording the nurse dignity at work, while the Hokki Stool is described in terms of the integrity that it affords the nurse who uses it.

Chapter 6 follows the results chapters with a discussion of the study findings in relation to both previous research and its implications for NICU related design, as well as the limitations of the study. Chapter 7 concludes the thesis with a brief summary of the entire study, a brief discussion of where this work could potentially go from this point, as well as recommendations for future NICU design and research. The thesis ends with a concluding statement, summarizing this study's contribution to scholarship and practice.

Chapter Summary

In this chapter, I introduce the study undertaken for this thesis. I provide some context to the study, state the problem and the research questions, and discuss the purpose and objectives of the study, as well as its assumptions and significance. The chapter ends with a brief introduction of myself as a researcher, along with an outline summary of the document as a whole.

Chapter 2: Literature Review & Background

Introduction

This thesis explores the question of how the neonatal nurse experiences the material/spatial environment of the NICU. This chapter includes a review of literature that provides the foundations of this research, along with the background theories, concepts and issues that inform the work herein. I argue that understanding how the neonatal nurse experiences, or lives in relation to, the objects and spaces of the workplace can lead neonatal nursing researchers (and NICU design researchers) to valuable insights, not only regarding the nature and practice of nursing, but also into the relationship between the physical environment of the NICU and its most pivotal resident, the neonatal nurse. The chapter begins with a definition of material culture and material culture studies, followed by a description of the relationship between material culture studies, affordance theory and design, and ends with a review of the existing NICU design literature, as it relates to the nurse's experience of the physical environment.

Material Culture, Material Culture Studies, & Design

This thesis is situated within the scholarly tradition of Material Culture Studies, which understands that objects, as they are produced, consumed, and used to mediate experience, have the potential to represent and/or evoke meaning (Hodder, 1998). As an interdisciplinary field of research, it deals with the importance of material objects from variety of different perspectives (Hicks & Beaudry, 2012). Due to the range of disciplines and perspectives that have taken material and/or spatial approaches to inquiry, the answer to what 'material' and 'culture' are in material culture studies, can vary somewhat (Dant, 1999). In this section, I define material culture, discuss material culture studies as a theory and an approach, as well as discuss the connection between material culture studies and design, as they relate to this thesis.

Objects, Spaces and Places

In this thesis, material culture is defined as the corporeal, tangible *objects* created by humans—be they a bobby pin, a jacket, or a building. Ferguson (1977, p.5-8) describes material culture as "all of the things people leave behind… All of the things people make from the physical world—farm tools, ceramics, houses, furniture, toys, buttons, roads and cities". In other words, it is everything and anything designed. Material culture refers to all of the objects, that are "picked up, exhibited and displayed, given, exchanged, sold, networked, watched, worn, glimpsed, read, ridden on, played with, collected, inserted, pissed into and thrown away" (Candlin & Guins, 2009, p.1).

Material culture, in this study, is also *space* and *place*. Space is "the structure of the world; it is the three-dimensional environment in which objects and events occur, and in which they have relative position and direction" (Harrison & Dourish, 1996, p.68). Space is the spatial arrangements that make up our world, along with the features that allow us to establish a reference to where something or someone is, in relation to ourselves—it is about proximity and distance, direction and orientation, size, shape, and volume (Gieryn, 2000). It is through the experience of space that we understand where the back of the bus is, or, how we know what someone means when they describe a building as tall. Place, on the other hand, is "the unique gathering of things, meanings, and values" (Gieryn, 2000, p. 465). Place has physicality, locality, and is defined by the interpretations, narrations, perceptions, emotions, and imaginings of those that experience it. A place can be a chair, a doorway, a nook, or a spot in a hallway.

In this thesis, material culture is defined as the objects, spaces, and places that make up our world. In the context of the NICU, material culture is all of the objects, spaces and places in the unit. The material culture of the NICU is just as much an incubator as it is a blanket or a feeding tube; a staff room as much as a hiding spot; and, a hallway as much as a syringe.

Humans and Objects

More than another name for the 'stuff' of our world, material culture is also the idea, or theory, that 'stuff' is shaped and used by persons (and society), while at the same time persons (and society) are shaped by objects. Material Culture Studies, as a field of research, recognizes this relationship between objects and humans and has as its purpose, to explore this. Past material culture studies have described how objects and spaces "embody goals, make skills manifest, and shape identities" (Csikszentmihalyi & Halton, 1981, p.1). Objects and spaces have the potential to provide feelings of comfort and hope (see Miller, 2005; Parrot, 2005); they play a part in the development, maintenance and expression of identity (see Stevenson & Winnicot, 1954; Dittmar, 1992; Were & O'Toole, 2008); they act as symbols of and (re)enforce norms, moralities, power structures, and politics (see Bourdieu, 1970; Winner, 1980; Latour, 1992; Gieryn, 2002), and influence our thoughts, and behaviours (Adams & Thompson, 2011). They are purveyors of messages, beliefs, and ideologies (Hebdige, 1988). They perpetuate, as well as elicit debate and critique (Dunne & Raby, 2013).

A Material Culture Studies approach to research understands that the objects and spaces that surround us are not merely the backdrop, or tools, of our lives, but rather the objects and places *through which* we live our lives. Hence, in this research, I consider the objects and spaces of the NICU as agential, as opposed to passive, entities that shape, mold, and give structure and meaning to the lives of the nurses. I attempt to look beyond the practical and utilitarian function of the objects and spaces of the NICU, to what the purpose of these is. What does it mean to the nurse? How does it play a role in how/what the nurse thinks, feels, and/or behaves?

Applied Material Culture

As discussed, Material Culture Studies is concerned with the relationship between people and 'stuff', or designed things—products, clothing, buildings, etc. Design, or the process through which 'stuff' is developed and created, is also concerned with the relationship between people and things, as it has as its goal to

"change existing situations into preferred ones" (Simon, 1996, p. 111). Meaningful and appropriate design is considered to be that which is understandable, useable, solves problems, fulfills needs, or simply works well (Buchanan, 1992; Norman, 2002). A 'good' design is one that complements the user by attending to his/her needs, motivations, perceptions, and conceptions (Norman, 1999; 2002). Hence, an understanding of the relationship between the designed object and the user, such as what is occurring in this research, is crucial to the development of meaningful and appropriate, or 'good', design (Norman, 1999).

A material, or Material Culture Studies, approach to the question of how neonatal nurses experience the objects and spaces of their workplace is useful for providing insights that have the potential to inform, or contribute to informing the development or design of NICU related spaces, products, and interventions (Buchanan, 1992; Pink, 2014). Observing and listening to how people (and in particular the end user) use, perceive of, and make sense of existing and potential objects and spaces—what Cross (1982) describes as "the knowledge that resides in objects" (p. 225)—has proven to be a recipe for successful or 'good' design (Norman, 1999). More than just "translating back from concrete objects to abstract requirements" (Cross, 1982, p. 225), the practice of material culture is thought to play both an analytical and generative role within design practice, in that it produces "new sensibilities, attitudes, approaches and intellectual properties" (Julier, 2006, p. 76).

Affordance Theory

Ecological psychologist James J. Gibson (1979) first introduced the concept of affordances as an alternative to the description of the environment as neutral and meaningless matter. The theory suggests that the animal's environment has inherent value and meaning, and that this value and meaning is perceived directly by the viewer as *affordances*. The affordances of the environment are "what it *offers* the animal, what it *provides* or *furnishes*, either for good or ill" (1986, p.

127). For example, water affords drinking, air affords breathing, and the earth affords support. Extended to artifacts, this means that what a person perceives when they encounter an object is what that object allows the person to do—a chair affords sitting, a ball affords throwing, and a handle affords grasping.

According to Gibson (1986) an affordance is:

> neither an objective property or a subjective property; or it is both if you like. An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacies. It is equally a fact of the environment and a fact of behaviour. It is both physical, and psychical, yet neither. An affordance points both ways, to the environment and to the observer. (p. 129)

Using the aforementioned examples to illustrate this: water affords drinking because it is fluid, the earth affords support because it is horizontal, flat, extended and rigid, and a ball affords grasping and throwing if and only when it is the appropriate size and weight (relative to the user).

Not limiting the concept of affordances to peoples' behaviours when confronted with objects, product designer and theorist Bill Gaver (1996) more specifically describes affordances as facts about action and inter-action. Gaver (1996, p. 3) opens up the concept of affordances, and moves beyond descriptions of affordances for behaviour (e.g. how a door affords opening) to descriptions of "affordances for sociality" (e.g. how a door affords accessibility and privacy). This makes affordance a useful concept for the understanding of social and cultural phenomena, relative to the physical (or designed) environment.

In terms of the complex spaces and technological objects of the NICU, as we will see, a space affords the neonatal nurse(s) a place to experience differing levels and kinds of privacy; a piece of neonatal equipment affords the nurse autonomy, personal space, and sense of being valued; and, an article of furniture affords the nurse physical freedom, a lack of constraint and physical intimacy in her work. It is one of the distinct contributions of my research to discuss in some detail how complex the affordances of such objects are, in terms of how they

enable the NICU nurses to experience a necessary privacy, dignity, and integrity in and at their work.

Affordance Theory & Design

The notion that objects (and spaces) have meaning that can be directly perceived by the viewer (or user of the object) has proven to be extremely valuable not only to those who study objects, but also to those who design them. The implication of this concept, for designers, is that affordances and constraints can be embedded into artifacts and spaces (Gaver, 1991; Norman, 2002), therefore inviting (or constraining) certain behaviours and experiences in users. This is a very enticing and exciting idea for design practitioners whose processes seek to create objects, places and interactions that are meaningful and appropriate. The notion of affordances serves as a useful tool throughout the many stages of the design process, creating an affinity between (the more often than not) conflicting needs and desires of the designers and users of an object/space (Maier & Fadel, 2009).

Moving beyond notions of usability and understandability, design is now tasked with embedding the intangible—value, affect, and emotion—into objects and spaces (Desmet & Hekkert, 2009; Norman, 2004). Products and spaces are not only designed to be easy to use, but also to promote particular psychological and social experiences, for example, attachment, collaboration, community, and privacy. Environmental sociologist Harvey Molotch (2011) states that:

> Getting intellectual access to affordances – what turns on whom and when with what—enables identification of similarities and differences of peoples across time and place. Such understandings also, of course, work the other way around: Knowing the cultural features of affordance makes the designer more likely to come up with a viable artifact. (p. 104)

To describe something in terms of its affordances, therefore, is to describe a relationship (and a complementarity) between an object and a subject. It suggests that to describe an object or space in terms of its affordances is to describe it relative to the human. What is it about the object itself that affords (or constrains)

certain behaviours and experiences for the perceiver/user? On the same token, what is it about the perceiver/user, that the object affords (or constrains) certain behaviours and experiences?

This relationship between objects and people is what makes the nurses' experience of the NICU an appropriate phenomenon to study through the lens of material culture studies. In particular, the lens of material culture studies, together with the concept of affordances, allows us to consider the complementarity of the nurses and the physical environment of their workplace, as described throughout this thesis. This kind of description, as noted, is useful information for the design of appropriate and meaningful NICU products and environments.

Design for Care

The design of the contemporary NICU is designed to facilitate the 'developmental care' (DC), 'family–centred care' (FCC), and 'family–integrated care' (FIC) of the neonate (see Als, 1984; Trajkovski, Schmied, Vickers, & Jackson, 2012; and O'Brien et al., 2013 respectively). The philosophy of FCC focuses on the health and wellbeing of the newborn and their family, through the development of a respectful partnership between the health care professional and the infant's parents (Trajkovski et al., 2012). It is built around the concepts of caring for the family, equal family participation, collaboration, respect and dignity, and the sharing of knowledge (Ramezani, Hadian Shirazi, Sabet Sarvestani, & Moattari, 2014). Family–integrated care is a newer philosophy of care that goes beyond FCC, in that it advocates not just for the shared caregiving of the infant (shared between parents and health-care workers), but for the parent "as an integral part of the NICU team so that they could provide active care for their infant, instead of being in a passive support role" (O'Brien et al., 2013, p. 2). Family–integrated care, as a strategy, might involve the parents staying in the NICU with their infant, as well as parents administering medication (feeds), taking part in rounds and doing basic charting.

Although DC, FCC, and FIC are all approaches to care that can be successfully implemented in the traditional open-bay NICU design (Griffin, 2006), the contemporary NICU (that I am studying) has adopted a single family room (SFR) model of design, which is thought to better support the behaviours and experiences that these care strategies aim to promote and support. These behaviours and experiences are primarily the family's comfort and privacy, increased communication and collaboration between the family and the nurse, and a more developmentally appropriate sensory environment for the neonate. My research is, therefore, especially engaged with the role the objects and spaces of this contemporary setting might play in the nurse's experience of practicing family integrated care.

Evidence Based NICU Design

Evidence based design (EBD) is an approach to healthcare design and design research. By definition, it is "the process of integrating the best research evidence, clinical and design experience, and client (patient, staff, hospital, and community) values to guide healthcare design decisions" (Stichler & Hamilton, 2008, p. 4). The emergence of this approach to the development, design, and construction of healthcare facilities is due to the cost of creating, managing, and maintaining these infrastructures; the impact these environments have on patients, staff, and families; and hence, the desire and need for sustainability (Ulrich, Quan, Zimring, Joseph, & Choudhary, 2004).

Evidence in EBD can range from a vendor's opinion to advice from an expert in health design or a healthcare practitioner, one's own experience, best-practice examples from site visits or published case studies, and various forms of qualitative and quantitative studies (Stichler, 2016). However, not all evidence is considered to be equal in value. Within EBD, randomized controlled trials and experimental studies (or systematic reviews of this literature) are considered to be strong evidence while descriptive correlational studies, qualitative studies, expert opinion, and clinical experience is considered to be weak (Pati, 2011).

Although not the primary objective of my research, it is my intention that this study contribute to the body of work that exists to inform the design and development of therapeutic, supportive, efficient and restorative healthcare environments. Moreover, it is my hope that this research will show that qualitative perspectives, and in particular material culture studies, not only have the potential to provide insight and understandings that contribute to the development of NICUs, but also that the insights that come from this approach are of significant value, and can be considered a valuable form of evidence, in the design and development of innovative, appropriate and meaningful healthcare design.

NICU Design Research

Inevitably, the EBD approach to hospital design has had a significant influence on the data collection and analysis methods that are chosen to inform the design of NICUs, and consequently, on the methods and approaches taken to study the relationship between the neonatal nurse and physical environment of her workplace. In this section I will discuss the current state of NICU design literature as it relates to the physical environment of the NICU and the neonatal nurse.

Impacts and Outcomes

A large portion of the research that links the physical environment, or design, of the NICU and the nurse, has as its goal to measure, evaluate and/or quantitatively describe the impact of the physical NICU environment on nursing practice and patient/clinical outcomes. The majority of these studies are post-occupancy evaluations that compare, not the design of the contrasting NICU models, but the perceived impact of the overall design on aspects of neonatal nursing. For example, Walsh, McCullough & White (2006) in a before-and-after survey of 127 nurse's perceptions after the move into a unit with single family rooms, reported that a majority of nurses believed that having single rooms increased their workload by forcing them to walk more (increased distances between infants). The single room design has also been attributed to decreased

communication and interaction between nursing staff (Cone, Short & Gutcher, 2010; Smith, Schoenbeck & Clayton, 2009; Walsh et al., 2006), making them feel isolated and unsupported while working. Through a survey of 75 nurses in three different NICU environments (2 SFR and 1 open bay) Shepley, Harris and White (2008) found that nurses working in an SFR unit experience greater job satisfaction and lower levels of stress than those working in open bay units.

These studies, however, do not provide detailed descriptions of the units that are being compared, other than to say that they are open bay or SFR. Nor do these studies associate any particular space or object within the NICU to any of the findings. For example, Toivonen, Lehtonen, Löyttyniemi, & Axelin (2017), in studying the effects of the single-family room model on staff's time allocation and staff–family interaction found that the SFR NICU design (in one particular hospital) increased duration of nurse–parent interaction, and did not decrease nurse–infant interaction time. This is wonderful news for proponents of family–integrated care, but what exactly is it about the SFR of that particular hospital that facilitates this? Is it the layout of the unit? Is it the single family room itself? Might it be the configuration of rooms? Is it a technology that is facilitating this outcome? In order for this research to be relevant to design it must be able to explain why and/or how this design does this. My research, through focusing on specific objects and spaces (and more specifically, by describing these in terms of affordances) considers the qualities, attributes, and characteristics of the material/spatial NICU that contribute to, and play a role in, certain nurse experiences and perceptions.

Shahheidari and Homer's (2012) systematic literature review of studies that look at the impact the of NICU design on neonates, staff and families, concludes that little research has been undertaken on the actual design of the NICU and that further research is needed on those particular aspects of the NICU design that impact nursing outcomes. An even more recent literature review of the effect of the physical NICU environment on nurses' work also concludes that "the literature is clear on what elements of nurses' work are impacted, but how the built environment influences these elements, and how these elements interact during

nurses' work, is not as well understood" (Doede, Trinkoff & Gurses, 2017, p. 101). It is the intention of my work to at least begin a scholarly focus on specific aspects of the NICU as an environment that consists of interactions between people, objects, and spaces.

Perceptions, Not Experience

Much of the research that looks to relate the physical environment of the NICU to the nurse does so through data collection methods such as questionnaires (Cone et al., 2010), scaled surveys (Shepley et al., 2008), and focus groups (Beck, Weis, Greisen, Andersen, & Zoffmann, 2009; Kain, 2011). Data is often analyzed quantitatively and findings presented in the form of descriptive statistics (Cone et al., 2010; Shepley et al. 2008). Although many studies attempt to qualify quantitative data with some form of qualitative method such as interviews (Hall, Kronborg, Aagaard, & Ammentorp, 2010) or, less so, observation (Shepley, 2006) the majority of design related NICU (nursing) research is based on clinical experience that is accessed though methods that do not allow for very much description or interpretation.

These methods, although informative and highly regarded as best practice in the field of evidence–based design (Stichler, 2016), do not access the question of how the neonatal nurse experiences the physical environment of the workplace. Questionnaires, surveys, and even focus groups, although seemingly appropriate for the sensitive and complex study setting of the NICU, are often far removed from the materiality and spatiality of the NICU, because questions are not asked that enable this materiality and spatiality to be discussed. The material culture of the NICU, its objects and spaces, hold tacit and emplaced knowledge and offer specific affordances—studying these aspects of the NICU offers another dimension to the research process, as well as to the insights that can be gained.

Design Features

There is a portion of the NICU design literature that does study certain aspects or design features of the NICU, and tries to understand their role in the experience of neonatal nursing. Aspects or features of the NICU environment that

have been studied include positive distractions, the sensory environment, and specific spatial configurations. Noise, for example, has been found to disrupt the nurse's work routine and decrease workplace satisfaction (Trickey, Arnold, Parmar, & Lasky, 2012). Bright and un-customizable light levels have been found to disrupt the nurse's circadian rhythms (Figueiro & White, 2013), while the inclusion of windows (natural light) and views of nature have positive effects on the nurse's stress levels (Shepley, 2006).

This work is important, and related to my own through its focus on particular aspects of the physical environment and how they impact the nurses' experience of work. However, it differs from my research in that it is looking at how categories of the physical NICU environment play a role in the nurse's experience of work. It brackets the physical environment of the NICU into ideas of things, as opposed to material things, or objects, in order to be able to measure or evaluate the impact of these, in relation to pre–set outcomes. Rather, my work looks to describe how aspects of particular material objects and spaces play a role in the neonatal nurse's experience of work. The objective of this research is to describe, not measure, a relationship between the physical environment of the NICU and the nurse.

There are no extant studies within the NICU design research, or EBD literature, that look to the objects and spaces of the NICU as a direct source of knowledge, or that at least consider that the objects and spaces of the NICU "embody goals, make skills manifest, and shape identities" (Csikszentmihalyi & Halton, 1981, p.1). While my study focuses only on a few particular objects and spaces, nevertheless, it is my intention that this study offers some consideration of how the material and spatial qualities of the NICU environment do affect the experiences and identities of the nurses who work there.

The Material Culture of Nursing

Although disparate and not part of the NICU design or neonatal nursing literature, there exists a modest body of work that aims to explore how nurses experience specific objects and spaces of the workplace. Of note are Olausson,

Ekebergh, & Österberg's (2014) exploration of the intensive-care nurse's experience of the bed space as a place of care, using the photo-voice technique (i.e. asking participants to take photos and then having them reflect on the photos in an interview); Mesman's (2012) ethnography that describes patient safety as a spatial achievement of the nurses working in an ICU; De La Cuesta and Sandelowski's (2005) study which describes Colombian caregivers' material strategies in managing the care of relatives with dementia; and Sarah Pink's (2014) visual ethnography of the role gels, water, and gloves play in the health organization's culture of safety.

All of these studies have proven relevant to my work in three ways: 1) by making aware the materiality of the nurse experience, 2) by showing that valid and useful insights can be gained by attending to how nurses use, understand, and discuss the material/spatial environment of their workplace, and 3) by further proving that an affective and sensory approach to inquiry affords insight that is rich and nuanced. However, they differ from my work in that, they do not seek an understanding of the affordances of the nurse's material/spatial environment—an understanding I see as crucial to linking the insights of material culture studies with design practice.

Conclusion

The neonatal nurse plays a pivotal role in the care of the neonate and the physical environment has the potential to negatively, and/or positively, impact the nurse's ability to effectively fulfill this role. There is a growing body of literature that looks at the specific relationship between the material/spatial NICU and the neonatal nurse; however, there is a shortage of studies that look to understand this relationship by engaging with the NICU itself and/or describing the relationship between the two.

Regarding the question of evidence in evidence–based design, scholar and intensive care unit designer Mahbub Rashid (2013) states that design knowledge resides "in everyday objects with little or no aesthetic value [and in] human

interaction with design" (p. 106), suggesting even further that design research in health care needs "thick and rich descriptions of design settings […] that tell the stor(ies) of how messy individuals, groups, and organizations are in any given environmental setting, so that we can try to make things better by design." (p. 121). Nurse researcher Margarete Sandelowski, argues that "a neglected focus of qualitative inquiry has been the material objects comprising the material world and culture of nursing" (Sandelowski, 2003, p. 185). In agreement with the above statements, I would further add that a neglected focus of NICU design research has been the particular objects and spaces comprising the NICU and the culture of neonatal nursing—a neglected focus that my work begins to direct attention towards.

There is a need for an approach to NICU design research that looks to the knowledge that lives in the nurse's everyday experience of the objects and spaces of her workplace. A material culture studies approach, such as the one I take in this thesis, provides a rich description of the relationship between the neonatal nurse and material/spatial NICU environment. The aim of this description is to foster a greater understanding of the nurse's needs, wants, and desires in regards to the designed environment. This thesis begins to address the gap of not having a material culture orientation within the NICU design and neonatal nursing literature. As well as providing greater understanding of how nurses experience the NICU as an environment of objects and spaces, this work aims to contribute knowledge that could potentially inform those involved in the design of future NICUs, so that this highly specialized environment could be designed through processes that are more attuned to the people who will be using it.

Chapter Summary

In this chapter I provided a review of literature that provides the foundations of this research, along with the background theories, concepts and issues that inform the work herein. I provide a definition of material culture and material culture studies, followed by a description of the relationship between material

culture studies, affordance theory and design. Through a review of the extant NICU design literature, as it relates to the nurse's experience of the physical environment, it is argued that there is a lack of understanding how the neonatal nurse experiences, or lives in relation to, the objects and spaces of the workplace. It is further argued that this understanding has the potential to lead neonatal nursing researchers (and NICU design researchers) to valuable insights.

Chapter 3: Methodology

Introduction

The primary purpose of this study, as revealed in Chapter 1, was to explore how neonatal nurses working at the Grey Nuns Hospital experience the material/spatial environment of the NICU. The methodology employed to achieve this end is presented in this chapter. This chapter is organized into seven sections: a) the research design and approach, b) data sources, c) data collection, d) data types and management, e) data analysis, f) issues of reliability and validity, and g) ethical considerations.

Research Design & Approach

As previously mentioned, to study material culture is to study the relationship between humans and objects—be it an object, a piece of furniture, an item of clothing, a technology, or a house. As a diverse collection of theorized approaches, material culture studies assumes that objects, as they are produced, consumed, and mediate experience, have the potential to represent and/or evoke meaning (Hodder, 1998). Due to the interdisciplinary nature of material culture studies, the answer to how to 'do' this is quite open and depends on the perspective and goals of the researcher. Different approaches produce different understandings (Hicks & Beaudry, 2012; Woodward, 2015).

The study of material culture is often understood as an embodied and sensory process that requires the researcher to fully engage with the artifact and/or environment under investigation (Prown, 1982; Tilley, Keane, Küchler, Rowlands, & Spyer, 2006). Methodologically, this approach might imply that the researcher study the object itself for evidence of past production and/or use, that the object be studied while in production or use, and/or that the

object/environment be exploited for the tacit and emplaced knowledge that it holds (Woodward, 2016).

In this study, the act of research was conceived of, and performed, with the understanding that knowledge is culturally constructed, and as such, it was recognized that the researcher confronts inquiry with his/her own beliefs, biases, and assumptions. Data collection methods were utilized not as a way of acquiring knowledge from the nurses but as a way to "produce knowledge with [them], in movement and through engagement with/in a material, sensory and social environment" (Pink, 2011, p. 272). The collection, analysis, and interpretation of data were understood as a process through which "the data and the interpreter bring each other into existence in a dialectical fashion" (Hodder, 1998, p. 173).

The research study was designed to allow for an in-depth exploration, and ultimately a thick description, of how neonatal nurses working at the Grey Nuns Hospital, experience the material/spatial environment of the NICU, and in turn, an understanding of the needs, wants, desires, and expectations of the nurses in relation to their ideal designed NICU environment. The intention was that the study would "draw out the everyday realities of people's experience and practice and provide(s) insights about how to make these experiences and practices more pleasurable and effective" (Pink, 2009, p. 7). With this in mind, and in keeping with the material culture studies approach outlined above, the research study was designed to be a reflexive (Finlay, 2002), sensory (Pink, 2009), inductive (Bernard, 2011, p.7), and descriptive case study.

Experimental psychologist Robert Yin (2003) defines a case study research design as "an empirical inquiry that investigates a contemporary phenomenon, within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p. 13). A descriptive case study design was deemed appropriate for this research because it allows the researcher to focus in on a specific population and context, and produce a rich description of a relationship or experience. A case study approach to research is recommended

when "a *how* or *why* question is being asked about a contemporary set of events over which the researcher has little or no control over" (Yin, 2003, p. 9).

Reflexivity, in this study, was defined as a process that persists throughout data collection and analysis, through which the researcher is constantly 'checking in' and engaging in an explicit awareness of his/her objectives, values, biases, and assumptions (Finlay, 2002). The design of the study acknowledged that the research process is one of "creating knowledge (about society, culture, and individuals) that is based on [the researcher's] own experiences" (Pink, 2007, p. 22) of them. As such, I do not claim to have produced an objective or ultimately truthful account of reality, rather a description of it, as filtered through my own experience of the research process and setting.

The research attended to the sensory by "accounting for the relationships between bodies, minds, and the materiality and sensoriality of the environment" (Pink, 2009, p. 6). The study was designed to promote the researcher's engagement with the material/spatial NICU and the nurses, as they moved through their work environment. Particularly in regards to data collection and analysis, the aim was to access the knowledge, memory, and experiences that live in the objects and spaces (and interactions with these) of the unit.

Figure 1 illustrates the different phases of the study, along with their respective methods, designed to move the researcher from a focus on the material/spatial NICU itself, to the interaction between the nurse and the material/spatial NICU, to a nurse-led description of the objects and spaces of the NICU. An inductive research design (Blakie, 1993) enabled the researcher to move back and forth between description and reflexive analysis, leaving the door open to more defined questions and concepts, as they emerged throughout the research process. Each phase was intended to allow for a thicker description of the relationship between the nurse and the material/spatial NICU.

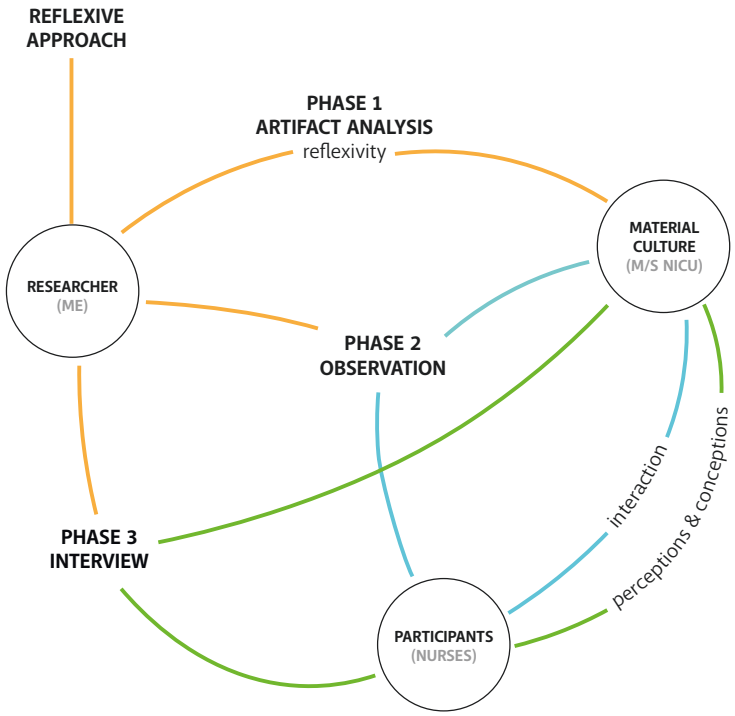

Figure 1. Phases and Multiple Methods

Limitations of Study Design & Approach

As discussed, a reflexive, sensory, and descriptive case study approach was chosen for this research. Although appropriate to the kind of question being asked and the phenomenon being studied it is important to be cognizant of the limitations of this approach to inquiry. Due to the nature of what is being studied, the usually small sample sizes, and the often qualitative and multi-method nature of data collection, case studies produce large amounts of complex and (more often than not) non-numerical data. This is a potential limitation in that the data can be difficult to synthesize and represent, as well as it renders it not generalizable to other, or larger, populations (Hodkinson & Hodkinson, 2001). This is particularly problematic, as it relates to research paradigms such as Evidence Based Design, which rely heavily on the generalizability of findings.

In this study, reflexivity has been defined as an explicit awareness of the researcher's own objectives, values, biases, and assumptions throughout the research process. Reflexivity, or the act of being reflexive, is therefore attempting to mitigate issues of validity and representation in the study. However, that act of saying that a study is reflexive, and even wholeheartedly practicing reflexivity, does not (and cannot) guarantee that reflexivity has actually occurred (Pillow, 2003). To some degree, qualitative research (and the case study in particular) simply requires a level of trust and openness on the part of the reader.

An alternative would have been to design this study in such a way that the data could be numerically represented, or in that I would not have had to depend so heavily on myself as the primary instrument for data collection. For example, the research questions could have been answered by asking participating nurses to provide descriptive answers to a set number of survey questions, in which they would have had to self-report and describe their experience of particular NICU objects and spaces. This may have reduced the need for reflexivity in this study (although it could be argued that there is always a need), as well as allowed for a more quantitative method of analysis. However, this would not have been in keeping with the aforementioned material culture studies approach to inquiry.

Data Sources

Data from this study was collected from the material/spatial environment of the Grey Nuns NICU itself, as well as the nurses that work within it.

The Research Site

The research site for this study was one neonatal care nursery at the Grey Nuns Hospital in Edmonton, Alberta. This particular NICU was chosen due to it being an intermediate-level neonatal unit, which was better suited to the proposed research design and methods, than a more fragile, acute-level care unit would be. The one site was deemed sufficient, as the purpose of the research was to study how a particular group of nurses experiences a particular environment (a single

case study) and because the study did not intend to generalize or compare findings.

The Grey Nuns neonatal nursery is an intermediate risk, level 2B unit, which means that it admits infants born at or greater than 31-weeks gestation. Renovations to the unit were completed in 2009 and included central monitoring, optimum soundproofing, and specialized lighting (Caritas Foundation, 2014), among other upgrades. It is a 34-bed, hybrid SFR design that "combines technology and atmosphere to offer a compassionate, family–centred approach to neonatal care" (Covenant Health, 2012, p.1). Approximately 1300 infants from across the city are admitted and cared for in a year (Neonatal–Perinatal Subspecialty Residency Program, n.d.).

Population

The population for this study was neonatal nurses currently working in the Neonatal Intermediate Care Nursery of the Grey Nuns Hospital. Any nurse with at least 120 hours of experience working in the NICU was eligible to participate in the study. It was assumed that anything less than 120 hours of experience would not be sufficient, since the study was looking for a reflective and detailed description of the nurses' experience of the material/spatial NICU environment.

Sampling

Because this research was designed to obtain useable data through multiple methods, and because material culture studies do not usually aim to generalize, a small sample size of possibly 5–6 participants was deemed a sufficient number to collect a thick description of how the nurses experience their actual and ideal or hypothetical material/spatial NICU environment. Due to the study's aims to describe and explore the experience of a particular and specialized population working in a particular and specialized environment, a purposive sampling technique (Bernard, 2011, pg. 145) was employed.

Eight nurses in total were recruited and participated in the study. Of the eight, one was a nurse practitioner, and therefore held a role and responsibilities

that differed from the rest, that of the registered nurses. The level of nursing experience (both in the NICU and other units) varied from nurse to nurse.

Data Collection

Because the NICU is such a complex and dynamic environment and because this study focused on developing a deep understanding of the material/spatial environment of the NICU, multiple methods were employed in order to collect a breadth of information. Data collection involved three main methods: an artifact analysis of the NICU; the observation/shadowing of nurses while working in the NICU; and, on–site interviews with nurses while off shift. Although the initial research design was to have data collected in phases, this did not transpire and instead data was collected as opportunities presented themselves. Data collection took about two months, with the interviews and observations taking about 3 weeks each, and the artifact analysis being performed all the way through. Over the two months, my presence in the unit was irregular (I would go in every couple of days and at different hours) but it allowed me to observe the unit during various times and circumstances, giving the research a larger breadth of data. I was there before, during and after the Christmas season, which also provided a different insight into the unit. Figure 2 illustrates the three main data collection methods used in this study, the relative time spent completing each phase, as well as the data types that came from each.

Reflexive Journaling

In keeping with a reflexive approach to material culture studies, a reflexive journal was kept throughout data collection. Journaling was done digitally through a word processing document, typically occurred the day after being in the NICU and served as a place to write down any methodological and analytic thoughts, as well as any descriptive notes (Bernard, 2011, p. 297–299). More than a notebook however, the journal was a place in which to document my own activities, circumstances, and emotional responses throughout the research process. This reflexive practice, served to locate the context of the researcher and the research

process (Etherington, 2004). The keeping of a journal provided a codebook for the formal analysis phase of the research, as well as it served as an audit trail, of sorts, documenting all aspects of the research.

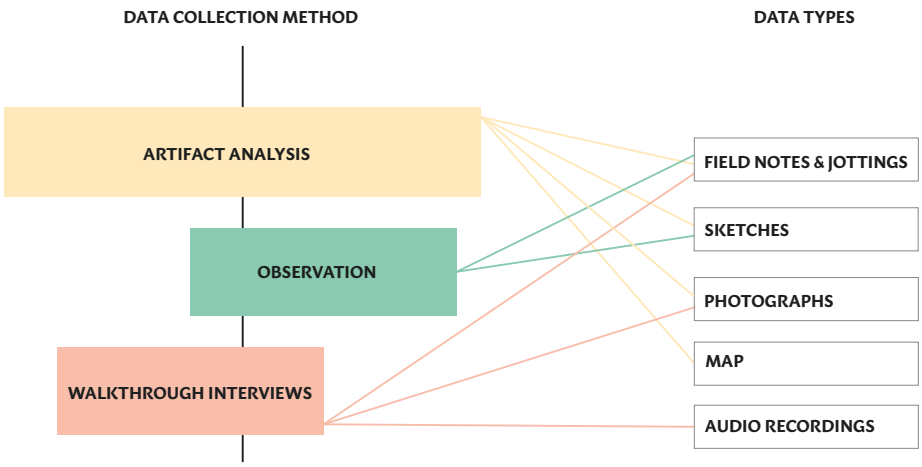

Figure 2. Data Collection Methods and Data Types

The Artifact Analysis

Data collection began with an artifact analysis (Prown, 1982) of the neonatal intensive care unit and was performed throughout data collection, in–between interviews and observations. The objective of the artifact analysis was not only to richly describe the material/spatial NICU environment, but in keeping with the reflexive approach of this research, to situate myself as a researcher, designer and mother, recognizing any preconceived biases and/or assumptions I may have brought to the research.

The artifact analysis was prearranged with the nurse educator of the unit and was initially scheduled to take a week or two. However, there was more to document and study than was anticipated and therefore this phase of data collection ended up taking two months, with observations and interviews

sprinkled throughout this time. Starting the artifact analysis a few days before any interviews and observations was helpful in acquainting me with the unit and this, in turn, bolstered my confidence going into the interviews and observations. The fact that the artifact analysis was performed throughout the two months or so of data collection, allowed me as an outsider and non-nurse researcher, to build a relationship with the nurses and staff of the unit. The first two days of the artifact analysis was conducted by two researchers (my supervisor and myself) while the remainder, was conducted by myself.

Collecting data through the artifact analysis involved the researcher walking around the NICU, while documenting and describing the material/spatial environment of the NICU through sketches and written notes. Notes and sketches were made on an Artifact Analysis Guide sheet (see Appendix A) with the aid of a 4–colour pen, a pencil, an eraser, and a tape measure. A to–scale map of the unit's layout was created, at first sketched by hand and later drawn digitally through graphics software (see NICU map on page 59). This map was later used to collect data throughout the remainder of the artifact analysis, as well as through some of the observations and the formal stages of analysis.

Prown (1982) suggests that in describing the artifact "it is desirable to begin with the largest, most comprehensive observations and progress systematically to more particular details" (p. 7). Notes and sketches drawn pertained to spatial information (e.g. floor plan layouts and the configuration of furnishings and spaces), a content inventory (e.g. a list of equipment, tools, technologies, supplies, furniture, decor, etc.), a material inventory (e.g. materials, signs of wear, physical traces of use, etc.), the sensory and aesthetic qualities of the space (e.g. colours, lighting, smell, textures, ambience, etc.), and my thoughts concerning such items. As the foci of this part of the research were the physical objects, structures, and spaces within the NICU, no identifying information pertaining to the staff and patients/families was recorded.

Photos of notable spaces and objects were taken near the end of the artifact analysis. These objects and spaces were documented through photographs either

because they were interesting to the researcher or because they had been brought to the attention of the researcher at some point (e.g. through casual conversation with a nurse). They were used at the beginning of formal analysis when I was listing and taking note of the objects and spaces that the nurses highlighted. They also served as a reflexive and verification tool, in the few moments when I was not sure if something I remembered, was actually the way I remembered it (or not). Perhaps even more significantly, however, the photos I took served throughout the process of analysis to remind me of, or 'take me back', to the NICU itself—what it looked, smelled, sounded and felt like (Pink, 2001).

The Observations (Shadowing)

Observation is a method of direct observation that is widely used in assessing the quality of human interactions (Barnard, 2011). Sociologist and designer John Zeisel (1981) suggests using observations of human behaviour and the environment as an empathetic, direct, and dynamic way to better understand the relationship between the physical environment and human behaviour. The objective of this portion of the study was to record and document how nurses in the NICU use, react to, deal with, avoid, modify, and adapt to their material/spatial work environment. What do the nurses interact with and how do they interact with items and spaces during their engagement with the NICU environment? How do they appear to move through and encounter the NICU?

With this objective in mind, I observed, in the style of shadowing (Czarniswka, 2014), six participating nurses for 3–4 hours each, as they went about their everyday tasks, activities, and routines. An observation sheet (see Appendix B) was used to guide, organize and code observations. Notes were made in the form of written notes (primarily), some sketches and map markings. Collected data from the shadowing consists of notable interactions (physical modifications, adaptations, usage, unintended contact, obvious avoidance) between the nurse and the artifacts, products, devices, and structures of the NICU. Object/space related (unsolicited) comments, telling facial expressions, bodily gestures, and qualities of interactions (nature, duration), along with my thoughts

and interpretations were also noted. Data was not collected during any coffee and/or lunch breaks.

The Walkthrough Interviews

The Walkthrough Interview was a semi-structured interview (Bernard, 2011, p. 157–58) that took place in the NICU. Each participant was asked to take the researcher through the unit, highlighting the spaces and objects that they felt something about, either negative or positive. Each nurse was asked the same question, albeit in a different way each time, to start the interview off but the remainder of the interview questions would come from the conversation itself, as well as a few questions based on what I had already observed and/or heard through other forms of data collection (see Appendix C). It was designed to be an explicitly collaborative, participatory, and empathic activity "whereby the researcher and participant actively collaborate in ways that enable the participant to 'show' their material and sensory environment and to demonstrate and discuss the experience of performing everyday practices" (Pink, 2011, p.271). With an understanding that the environment (place) holds important aspects of peoples' experiences and forms of knowledge, the tactic of "talking whilst walking" (Anderson, 2004, p. 254) was meant to exploit both the evocative potential of place and the relaxing act of walking, as a way of producing a deeper and richer knowledge with the participant. The walk-through interview was meant to access the "atmospheres, emotions, reflections, beliefs […] intellects, rationales, and ideologies" (Anderson, 2004, p. 260) that the nurses hold around the objects, devices, and spaces in the NICU.

The walkthrough interview with each nurse took place at the Grey Nuns NICU at a pre-arranged time and date that was convenient for the participating nurse. In each instance, except for one, the interview took place while the nurse was off shift, in order to allow for a session that was as free of interruptions and professional responsibilities as possible. The shortest interview was 45 minutes while the longest was 80 minutes and they took place at varying times of the day and week.

All interviews were audio recorded with a digital recorder from the university and photos were taken with a digital point-and-shoot camera, also borrowed from the university. Any notes were jotted on a clipboard (on loose leaf) and pertained mainly to where in the unit we were during the interview. Photos were taken to document objects and spaces that the nurses pointed out as significant. These photos in particular, were very useful in the analysis stage, not only because they documented particular objects and spaces, but also because they allowed me to return to the conversations and moments I had with the participants, in a way that my notes and drawings did not (Pink, 2011).

Data Types & Management

The aforementioned data collection methods resulted in a wide range of data types, which include:

1. **Field notes** and **jottings**, as well as reflexive **journal entries** regarding observations and the researcher's analytical, personal, and methodological thoughts;

2. **Sketches** made by the researcher throughout observations (shadowing) and the artifact analysis, of layouts, object–human configurations, and interactions (see Appendix D);

3. **Photographs**, taken by the researcher during interviews, of objects and spaces pointed out by participants, as well as those taken during the artifact analysis of objects and spaces notable to the researcher (see Appendix E);

4. **Map** of the NICU layout (walls, built in furniture, windows and doors), and;

5. **Audio recordings of interviews** with participating nurses, while walking through and discussing the material/spatial NICU environment with them.

This complex and rich set of data provided the breadth and depth of information needed to vividly describe the phenomena of the nurses' experience of the material/spatial NICU. The diversity of the data sets allowed for the comparing, contrasting, and layering of data.

Data Organization

This study, as many qualitative multi–method studies do, produced a great amount of data in a variety of formats. Prior to commencing the formal analysis phase, it was ensured that all physical data had a digital copy and vice versa. A digital photograph log was created to identify the date the photograph was taken and the subject matter, and all photographs were printed in a 4X6 format. All field notes written on paper (including sketches and maps) were scanned and made into digital files, and audio recordings were transcribed. All digital and physical files belonging to the study are stored on a master USB and stored in a locked cabinet in the Department of Human Ecology. The researcher alone conducted the preparation and analysis of data.

Data Analysis

In keeping with the iterative nature of qualitative inquiry, data collection and analysis informed one another iteratively in this study. The analysis of noted observations and thoughts occurred in the field, away from the field, and after being in the field (LeCompte & Schensul, 2013). Themes and concepts emerged while in the field that no doubt shaped later observations and ideas. Analysis was a data driven and inductive process, allowing for both semantic and latent themes and concepts to emerge, relative to the study's research questions (Braun & Clarke, 2006). As with data collection, a mix of visual, and textual, analytical methodologies were used in order to bring a range of diverse data sets.

Data Preparation

Data preparation involved transcription of interview data as well as the mapping of data from all parts of the data collection process, which beyond

preparing for the more formal task of analysis, allowed the researcher to familiarize herself with the data.

Interview Transcription

In preparation for the more formal stages of analysis, the audio-recorded interviews were transcribed and each interview's respective photographs attached to the transcription as an appendix. A verbatim, but naturalized (Bucholtz, 2000) style of transcription was used in this first, formal phase of data analysis. This naturalized and slightly literary, or screenplay-type, style of transcribing was chosen not only because of its readability, but because it allows for the feel, tone and context of the conversation to come through. The following is an example from one of the interview transcripts (Int 1):

Me: **Okay. An Alberta theme?**

Int1: Yeah, so they have the Alberta theme, so **[interesting]** if you look at the colours **[okay]** so there's colours all through the unit.

[Yeah] I'll show you that but that's the Alberta theme

Okay ((we start walking over towards Pod 1))

So when the architecture was designed, so kind of these colours

Yeah. So yeah, cuz you see, like I see the theme as I go through and as I've been doing my artifact analysis um, you become very aware that there is a theme but I didn't realize it was an Alberta theme

Yeah when I um ((showing interviewer something)) **[okay]** when I got my tour before it opened here they pointed all that out so you can see, so in the floor designs [**Uh-huh**] is that and all the

> neutral colours and then um ((opens the curtain)) kind of when you look at the colours of this **[Uh-huh]** um the colours of this stuff, even the leaf patterns here **[Yeah]** and the grass.

In keeping with the study's approach and aims, contextual details such audible sounds, highlighted objects and spaces, as well as how we moved through the unit (locations, spaces and objects) were noted. I developed my own notation system to illustrate long pauses, self-interruptions, descriptive intonation changes, and conversational turns. Any substantial part of the conversation that was not relevant to the research topic and of a personal nature (either between the interviewee and researcher or another nurse and the researcher) was omitted from the transcript.

Formal Analysis

Because this study is exploratory in nature, and because the research is interested in the nurses' experience of the material/spatial NICU, interview data was used as a starting point for analysis. Analytic techniques such as memoing and concept diagramming (Corbin and Strauss, 2008) as well as mapping (Powell, 2010) were utilized throughout the process of analysis (see Appendix F). Formal analysis of the data was carried out in the following phases: 1) initial coding, 2) finding themes, and 3) the review and defining of themes (Braun & Clarke, 2006).

Initial Coding

Initial coding of the data was undertaken by conducting a 'read-through' of all of the data organized and prepared data, in order to gain an overall feel of the data collected. From here, the interview transcripts were coded for concepts relating to the nurses' experience of the material/spatial NICU. Initial 'codes' that came from this activity were the concepts of safety, comfort, distance/proximity, adaptability, respite, communication, sharing, efficiency, reliability, and us/them. With these featured objects, spaces, ideas, and perceptions in mind, the other data sets (photographs, observational notes and sketches, journal entries, and maps)

were studied for any important observations that might compare to or contrast with these initial 'codes', as well as any new ones that might come along.

A separate reading of the data was conducted in which significant spaces and/or objects were compiled into a list. These significant objects and spaces were not only things that the nurses themselves explicitly highlighted or spoke about, but also spaces and objects the researcher found to be significant to the nurse's experience, either through observation or indirectly through conversation.

Finding Themes

These significant objects and spaces were then analyzed in terms of what they afforded the nurse. Some of the objects and spaces that emerged as notable/significant to the nurses were the orange blobby stool, the Back 5 and the Back 9, mobile phones, the storage rooms, the individual patient rooms (including furniture and layout), keyboards and mice, work desks and windows.

Reviewing and Defining Themes

Based on the spaces, objects, and concepts that emerged from the data as salient and meaningful, a series of 'noticings', or material vignettes, were written by the researcher as a way to ensure that the data supported these. These material vignettes allowed the researcher to further develop and define the themes that would form the bulk of the reported results—mainly that of Pod 1 and privacy, the Overhead Warmer and dignity, and the Hokki Stool and integrity.

Issues of Reliability & Validity

In keeping with most qualitative research in material culture studies, this research did not seek the universal, in that it did not assume that its findings would be generalizable to all NICU nurses in all NICUs. Rather, this research aimed to tell an in-depth story, or describe in detail, the relationship between a specific group of people and their material/spatial environment. Implicit in the study's approach are issues of reliability and validity; these were addressed

through thick description, data and method triangulation, and researcher reflexivity.

In order to ensure that the description of the NICU and its relationship with the neonatal nurse is rich, robust, and comprehensive, data was collected from two different sources (the NICU nurses and the NICU itself) and through three different methods of data collection. Triangulation of data (sources) and methods provided a rich and thick description of the material/spatial environment of the NICU, the interactions that occurred between the nurses and this environment, and the ways in which the nurses perceived of and discussed particular objects and spaces of the NICU. This study was designed to move inductively and reflexively from phase to phase, the limitations of one method "cancelled out by the strengths of another" (Lincoln & Guba, 1985, p. 306). A reflexive sketchbook-journal (Etherington, 2004) was kept throughout the process of data collection and analysis.

Ethical Considerations

As this research was designed to take place in a health care environment, ethics approval for the study was sought out from the university's Health Research Ethics Board (HREB). After ethics approval, access to NICU administration was gained with the help of Dr. Michael van Manen, who introduced me as a researcher to Dr. Byrne, the Grey Nuns NICU site director. After personally meeting Dr. Byrne and discussing the study, I was introduced to the unit manager and the NICU education coordinator, both of whom were instrumental in introducing and connecting me to potential participants. Participant recruitment efforts involved me presenting the study to the unit as well as emailing potential participants identified by the unit's education coordinator.

Informed consent was discussed and obtained from each of the eight nurses that agreed to participate in the study. Of the eight nurses, three participated in both the observation and interview, and five participated in either the observation only or the interview only. Informed consent was obtained before each data

collection activity and participants were gifted a $10 gift certificate from the coffee shop of their choice for their participation in each research activity. Approximately 3–5 days after the end of their involvement in the study, a follow-up email was sent to each participant, thanking them for their participation and inviting them to add to or discuss their participation. However, none of the participants requested a discussion or had anything to add.

Once the data collection phase was complete, I gifted the unit a couple of boxes of chocolates and a 'thank–you' card as a token of gratitude. After formal analysis was complete, a presentation of findings was presented to the unit. This was performed not as a way of validating the findings but out of respect to the participants and the unit staff.

Chapter Summary

In this chapter, I have discussed the methodological foundation of this thesis research. Through this discussion I have described and/or justified the approach that informed the research design, data sources, data collection methods, data types and management of data, the analysis of the data collected, issues of reliability and validity, and ethical considerations within this research. The results of this process are to come in the two chapters that follow.

Chapter 4: Pod 1

Introduction

This chapter is the story of Pod 1, which despite being identical to Pods 2 and 3 (as will be discussed below), is used quite differently and serves a very different purpose for the nurses. More specifically, this chapter is the story of what Pod 1, as a space, affords the nurse(s)—privacy. It is the story of how the nurse desires privacy throughout her workday, how the physical NICU does not entirely fulfill this need, how she uses Pod 1 to achieve a desired level of privacy, and what it is about this space that it is able to provide this experience.

As suggested by this summary, a description of affordances, is not a straightforward description of physical attributes. It would not suffice to simply describe what Pod 1 looks or feels like. In order to describe what Pod 1 affords the nurse I must describe the space relative to the nurse—how she interacts with it, perceives it, and conceives of it (Gibson, 1986). Therefore, in this chapter, and with this aim, I describe what Pod 1 characteristically affords the participating nurses by first describing how they use the space. I follow this description with short vignettes that illustrate select aspects of what it is like for the nurse to work in the Grey Nuns NICU—what it sounds like, what it feels like, and some typical situations. This all sets the stage for a description of Pod 1 as a space that provides the nurse a place(s) for privacy, both on an individual and a collective level. I end the chapter with a concluding description of Pod 1's affordances, or what it is about the space that affords the nurse this experience.

The Grey Nuns NICU

The Grey Nuns NICU is configured using a neighbourhood/pod/cluster design (Shepley, 2014) in which single family rooms are clustered together, making up different 'neighbourhoods', or care spaces, within the unit. There are 5

care spaces within the Grey Nuns NICU: the ‘Back 9’, the ‘Back 5’, ‘Pod 1’, ‘Pod 2’, and ‘Pod 3’ (Figure 3 provides a map of the unit that I put together as part of the artifact analysis phase of data collection). Pods 1, 2, and 3 are located along the right hand side of the unit and are designed to support higher acuity cases, while the Back 5 and the Back 9 are located near the rear of the unit and are designed to support infants (and their families) who are relatively stable. In terms of design, Pods 1, 2, and 3 are basically identical. Each is designed as a cluster of single family rooms that come off of a common area, which holds computer/work desks, sinks, and a formula prep station or two. There are three rooms on either side of the common area (three on the left and three on the right) and the formula prep station sits at the top, a window overlooking southeast Edmonton above it. All three pods can be closed off to the rest of the unit with sliding glass doors, all three have the same lighting design, and the décor is the same for all three. In terms of form, there are only slight differences between the three, the majority relating to differences in the size of individual SFR rooms and the location of one or two elements.

The SFRs in the pods are all approximately 10ft long by 8ft wide. Each room is enclosed with walls, and a curtain separates each from the common area of the pod. The SFRs are designed with the intention to promote family–centered care and therefore the far end of each SFR is dedicated to the family. The family area of the SFR can be closed off by a curtain (indicated by the dash line on the map) and has a built in bench for sitting/sleeping, as well as storage for belongings (the idea being that family will stay overnight). The rest of the SFR is dedicated to the care of the infant and is designed to fit one infant, his/her accompanying equipment, and a chair. A curtain, as well, can close the infant area off.

A Different Pod

Pod 1 is located at the front of the unit, right beside the front desk, just as one comes out of the airlock that serves as the unit entrance. It is designated as an

overflow pod, meaning that it is only opened for patient care when there are no available rooms in the rest of the unit[1]. In the time I was there, which I was told was a very busy time of year, I think I saw it used for infants twice. The fact that Pod 1 is very rarely used as a care space makes it available, or open, to the nurses to use it for other purposes, and they certainly do.

The nurses use Pod 1 as a storage space. There is always something stored at the back of the unit—incubators, cribs, breast pumps, reclining chairs and chair beds that they need out of the way. When I was there it was Christmas time and they had stored Tupperware boxes of holiday decorations that were to be put up by the staff—on benches, on the floor, on top of equipment and furniture. Much of the stuff that is in there is there because it isn't being used at that time, because they need the space in other areas of the unit, or because they simply do not have anywhere else to store it. I often got the impression that it was the storage space of choice because of the fact that only they really access this space (I will describe this further in a later section).

They use it as a work or private meeting space. I once saw a nurse working at a computer in there, in the dark. On more than one occasion I saw either a pair of nurses or a few nurses go in to discuss something, either at a work desk or at the formula prep station. Also, I was taken in there on many occasions to sign consent forms and discuss my research.

They use it as a classroom. There is a classroom on the floor that is used for education and professional development, but very often it is booked or not suitable for what they are doing in the class. This is when they use Pod 1. One nurse said that sometimes it was actually a better classroom because they could simulate things in the SFR, using actual equipment.

They sometimes take their break in Pod 1. Nurses described how they and other nurses might go into one of the SFRs, pull back the blinds and hide. Some

[1] The NICU has the budget to provide care for 27 infants at any one time. If an infant is placed in Pod 1 it is usually moved to one of the other (funded) pods as soon as a bed comes available. A baby/family placed in Pod 1 might only find themselves in it for only a day, or even, a few hours before they are relocated to another space.

will sit in a recliner or on an SFR bench and sleep, read, eat a snack, or make a phone call. Although there is a staff break room/lounge in the unit, Pod 1 very much serves as a makeshift break room.

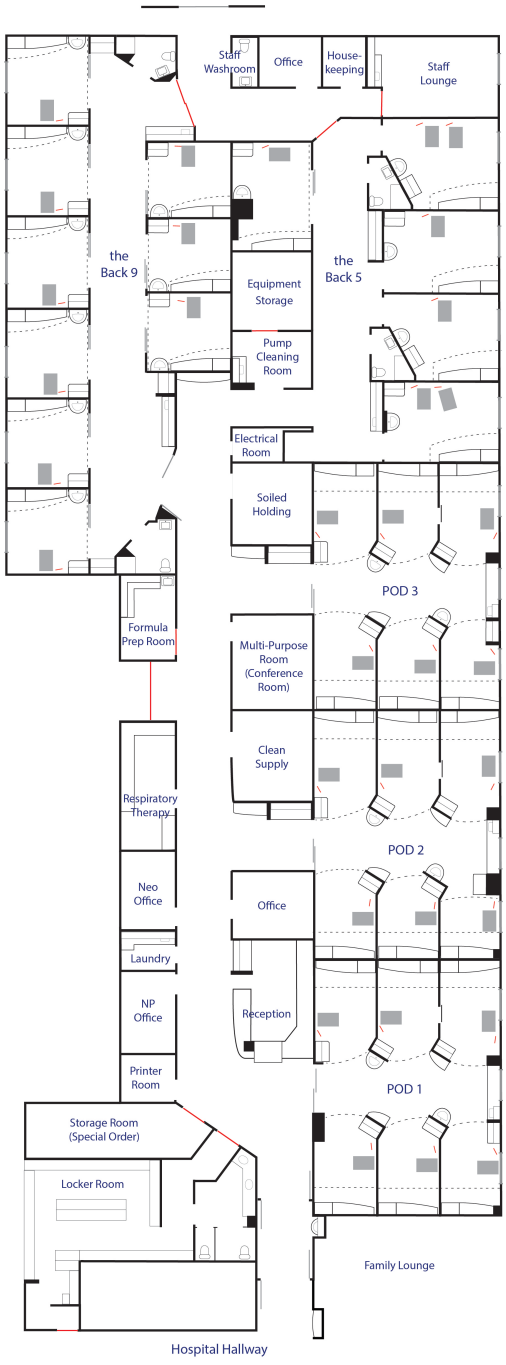

Figure 3. Map of the Grey Nuns NICU

Prior to describing what Pod 1 as a space affords the nurse, I will first describe the context within which this space and the nurses coexist. I do this so that, later on in the chapter when I am describing what Pod 1 affords the nurse, the reader is equipped with enough of a background to understand why this is so. In this section I describe certain realities and phenomena that involve the nurse and the material/spatial NICU. I describe, in particular, the NICU as a stressful place, the nurse as a public figure, the experience of attempting to taking a break, and the fact that the nurses share most things (and spaces) and individually possess very little.

The NICU is a Stressful Place

At first, the Grey Nuns NICU appears to be an orderly, calm, and even downright peaceful place (and at times, it really is). But a few hours following a nurse who is working, reveals an organized chaos—a combination of people and things everywhere, and in constant flux. There is a sensory overload that the nurses experience on a daily, or often minute-to-minute, basis in the NICU that causes them to feel overwhelmed, exhausted, out of control, and claustrophobic. Crowding, clutter, and the cluster of people and things that compete for their attention, all contribute to this experience.

The rooms, although spacious when empty, can become quite cramped with equipment (overhead warmers, incubators, IV stands, mobile monitors), furniture (recliners and sofa beds) and people (nurses, parents, visiting family, staff doing rounds). Equipment often will spill out of rooms and into the common areas of the pods, the 'in-between' area just outside of the pods, and the main hallways. Equipment (breast pumps, scales, carts, etc.) can very often be found along the walls of the main hallway, either waiting to be cleaned, waiting to be used again, or waiting to be stored away.

The work desks can often be cluttered with 'stuff' (water bottles, stethoscopes, pens, and handbags) that isn't really supposed to be there and that

"gets in [the] way" (Int 2). The nurses often complained about the clutter of the unit, and how they "hate clutter" (Int 1 and 3). They described having to make their way through care spaces and rooms cramped with equipment, and having to move things out of the way so they could work. Many felt it was unsafe and a work hazard.

It is noisy in the NICU, especially during the day. There is a constant hubbub in the background that comes from the equipment—the hissing of the oxygen, the 'bing-bonging' of alarms, monitors and equipment—calling out (sometimes nicely, at times aggressively) to the nurses for their attention. Phones ring. Printers print labels. Infants cry. Nurses are chatting. Someone is on the phone. The doors constantly slam as they lock when someone goes through it.

This sensory overload is not uncommon in hospital environments, in particular intensive care units. Intensive care nurses have identified high noise levels (talking and noise from equipment), crowdedness (people and equipment), and a lack of space as elements of the physical clinical environment that act as performance obstacles (Gurses & Carayon, 2009). Morrison et al (2003) found that noise correlates with annoyance and physical stress measures such as increased heart rate. Topf and Dillon (1988) cite noise-related stress as positively related to nurse burnout in the critical care workplace. Noise and clutter have been identified as causes of physical and psychological stress in the workplace (Chen et al., 2009; Walsh et al., 2006).

The Nurse is a Public Figure

Neonatal nurses are very much public figures in the NICU, in that they are quite visible and exposed. They are constantly available to the infants, the parents, and co-workers. There is very little time and space for the nurse, and very few places to hide. This is, in part, due to the open concept and decentralized[2] design of the care areas. The care areas are designed in such a way that the single family

[2] Traditional open–bay NICUs had a central nurse work station from where nurses could work and monitor infants under their care. The adoption of the SFR model of NICU design brought with it the decentralization of the nurse work station, dividing the one work station of the past, into as many as is appropriate to the layout and configuration of the care areas and SFRs (Shepley, 2014).

rooms all come off of a common area. This common area is where the nurses' two computer stations are, the chart desk (in the case of the Back 5 and 9) and the formula prep station(s). It is completely open concept, with no walls, no curtains, and no partitions to separate the chart desk and computer stations (which are considered by the nurses as their territory) from the rest of the space. Unlike the infant family, the nurses do not have a curtain or a door that they can close when they require privacy or quiet to do their job—e.g., charting, studying, or just taking a moment to zone out.

One participant described a typical situation in the common areas of the care areas, in which she might be huddled around the central monitor with other nurses in the evening when it is 'quiet'. She is chatting or working on something, and a family member (usually a mom that is in need of company and conversation) comes to where she is (they are) and starts a conversation, or tries to enter into theirs:

> And so people are coming out to come into my space. On the one hand, I don't want them there because my job is hard enough, and I don't really need to feel "on". Right? Like, you're in an act. You don't necessarily feel "on", because you're sitting there. And somebody ruined your Zen moment. (Int 5)

Open concept and decentralized nursing units such as the ones in the Grey Nuns NICU pods/care areas have been shown to increase opportunities for team interaction and increase patient room visits, through increased visibility and accessibility to patients/patient rooms (Gurascio-Howard & Malloch, 2007). The typical situation that this nurse describes, however, indicates that this increased visibility and accessibility works both ways. As much as the patient is more visible and accessible, so is the nurse. In this space the nurse is not only quite exposed and unprotected from the gaze of others (patient families and team members) but she is also constantly available to them, even when she doesn't want to be (or needs to not be).

Taking a Break

The unit does have a staff lounge in the 'staff area', located at the rear of the unit. The staff area is a region of the unit that is adjacent to, yet separate from the unit and requires security access. The staff lounge is a square room with a large window facing a green space and residential area, it has a kitchen area complete with fridge, microwave, and toaster oven, and a sitting area complete with two love seats, two chairs, a coffee table, and a television that sits on a large buffet.

The nurses are very grateful for this space, and quite a few made a point to tell me so. However, they also told me they felt it was quite small, the furniture quite big (and too much) for the space, and feels quite cramped, even without people in it. It can get "a bit squishy" (Int 4) at times, as there is sometimes not enough seating for the amount of people that are in there, causing people to have to give up their seat before their break is over or stand at the counter to eat. At times, it can also be quite busy and loud in the staff room. The television is usually on, the lights are always on and there are almost always nurses talking, often about work related topics.

In discussing an ideal staff lounge, one nurse mentioned that she used to work night shifts and that it would have been nice to have a place to sleep, stating that "nurses work better when they have room to sleep" (Int 5). Although a nurse could technically sleep in the staff room (on one of the couches) the reality is that there are usually people in there, and even if there isn't, someone will most likely come in while you are in there. Another nurse described a common situation in which one is in the staff room and someone is watching TV quite loudly and "you just want it quiet, because you've had more than enough stimulation in your day" (Int 4).

Some nurses leave the unit to take their break, down to the bottom floor of the hospital, to the cafeteria. The problem with this however, is that it is far and takes up the majority of their break time, and that they don't get to completely 'turn off' when they do this, either. When they go downstairs, they are in their

scrubs and, according to one of the participants, two things happen when you go downstairs in your scrubs:

> Two things happen when you're out and about in the rest of the hospital. One, its busy and overwhelming and there's lots of other people around and you're still a nurse. You're still visibly a health care provider if you're sitting in the cafeteria, right? And if something happens people will still look at you like a health care provider, so you're still 'on', right? You're still in your role. And also families can totally find you. Like, you know, they're in the same cafeteria as you and that's exciting. When you go downstairs and you're grabbin', you know, a bowl of soup and you get to see them and you wave 'hi', and you know, that's so exciting, and then you go on your way and you go into your space to decompress. (Int 5)

An investigation of restorative components of staff break areas by Nejati, A., Shepley, M., Rodiek, S., Lee, C., and Varni, J. (2016) found that nurses prefer (or are most likely to use) break spaces that offer comfortable seating options (e.g. sofas), are located in close proximity to patient care areas, provide complete privacy from patients and families, access to nature and daylight, and physical and/or visual access to the outdoors. Nurit and Michall (2003) define meaningful and restorative rest as "physical and mental activity resulting in a relaxed state" (p. 227). Their exploratory study of seven nurse's experience of rest at work indicates that the restorative value of rest came from engaging in "activity that was personal, quiet, and effortless, experienced alone or with friends" (2003, p. 227). Although the nurse is provided a break room, it is not always the restorative, or 'decompression', room that they may sometimes need or desire at any given time. The nurses have the option of leaving the unit and going to the cafeteria, but that is not a space where they feel at ease or that that are able to 'turn off'.

Not Much to Call Their Own

There is very little that the nurses consider 'theirs', and theirs alone, in the NICU. They share most things and most spaces, either with other nurses, other

staff members or the infant's family. They share desks, tools, chairs, equipment, computers, and everything in between. Beyond physical objects, they also share all the sounds, smells, and temperatures of the NICU. Based on my observations, I feel it is safe to say that the clothes on their back, the shoes on their feet, and the few objects they bring to work with them each day (e.g. calculators, cell phones, pens, stethoscopes, etc.) are the only things the NICU nurses can honestly say are theirs.

Although the nurses feel as if particular 'public' or communal spaces (and objects) within the unit are 'theirs', these are still accessed (actually and potentially) by other groups. For example, the infant family has total access to, and uses (to a degree), the front part of the single family room, as they also do with the common area of the pods. The front of the SFR, in particular the work desk and the area around it, is very much considered by the nurses to be "their space" (researcher's quotations) when they are working. It is unsettling and throws the nurse off when parents use it for their own purposes. This distinction is very often communicated to the parent early on in the relationship, so as to not cause any problems.

The nurses have access to most of the spaces in the NICU, although there is not one space that is for 'neonatal nurses only', as there is for the neonatologist, the respiratory therapists, and the nurse practitioner. Areas that are not accessible to the families, such as the staff room, staff bathroom, and locker room, are still accessible to anyone who has key card access (which is almost any staff member in the hospital).

Privacy (What Pod 1 Affords the Nurse)

The previous description of nursing in the NICU reveals workers that are often inundated and overwhelmed by the melee of spatial, emotional, and sensory stimuli that surround them. It reveals a nurse that feels exposed, constantly available, and with very few places to hide. The nurses working in the Grey Nuns NICU lack a space where they can truly rest, be alone, and disappear. The nurses

share everything, lest a few personal items and spaces that are truly theirs. It is safe to say, at this point, that the nurse lacks privacy in the workplace. They are lacking the ability (and/or space) to retreat from stimulation, social interaction and observation. They are lacking the experience of solitude, isolation, and anonymity.

Irwin Altman, renowned for his research in environmental psychology, understands privacy to be a process through which a person regulates how open or closed one is to others and the environment (1975). Altman and Chemers (1980) posit that the successful management of privacy is central to psychological viability and wellbeing. More precisely, Altman and Chemers claim that "the success or failure at privacy regulation may well have implications for self-identity, self-esteem, and self-worth—or the very wellbeing and survival capability of people and groups" (1980, p. 81). In the workplace, in particular, the ability to regulate privacy has been linked to job satisfaction, work performance and wellbeing (Vischer, 2007; Laurence, Fried & Slowik, 2013).

In this section I argue that Pod 1 affords the nurse much needed and much desired aspects of privacy. I do so by describing the different *places* it is for the nurse(s): a place to 'get away', a place to 'turn off', and a place to 'call their own'. Gibson acknowledged that "the habitat of any given animal contains *places"* and that "the different places of a habitat may have different affordances" (1986, p. 128). By describing Pod 1 in terms of *place* I describe both how this space acts as a tool with which the nurse achieves privacy, while at the same time describing the layers, or different aspects, of privacy the space affords the nurse.

A Place to 'Get Away'

The fact that the nurses go to Pod 1 to take their break, to sleep, to read, to work, and/or make a personal phone call, coupled with the fact that the NICU is stressful place for the nurse, suggests that Pod 1 affords the nurses a physical space in which to distance themselves, or 'get away', from the stressors and discomforts of the workplace—the noise, clutter, heat, the infants, the parents, and

the staff. It is affording the nurse refuge from excessive stimulation and social satiation.

When a person says they are 'getting away' or going on a 'getaway' they are usually talking about going on a holiday, away from the stress and pressures of daily life. Talking about 'getting away' conjures up images of retreat and relaxation. Pod 1, in this instance, is a "retreat box" used as an extreme de-stimulation area for the nurse (Richer & Nicoll, 1971, p. 6). Previous literature suggests that the need for privacy in the workplace may come from a desire for mental concentration and confidential conversations, the avoidance of distraction, interruption, and noise, as well as the optimization of crowding (Altman, 1975; Sundstrom, Town, Brown, et al., 1982; Kupritz, 2000). Pod 1 is in many ways an informal and self-proclaimed break room for the nurse.

A Place to 'Turn Off'

As well as 'getting away', or escaping the pressures and the stimuli of the NICU environment, Pod 1 is a space the nurses go to be able to 'turn off'. Through an analogy that equates social life as a theatrical stage in which every person is in constant performance, sociologist Ervin Goffman (1959) hypothesized that people live their social lives in two regions: front and back. In the front region or when a person is 'on stage', they behave in accordance with what they understand to be appropriate to the setting they are in. In the back region, or when a person is 'off-stage', they relax and permit themselves to rest and behave in ways that are appropriate to being unobserved, or 'in private'.

It could be said that the rest of the NICU is the nurse's 'front region' and that Pod 1 is the nurse's 'back region'—literally and figuratively. Nurses juggle a variety of emotions and present many 'faces' throughout their workday (Bolton, 2001). Pod 1, as an 'off-stage' area, affords the nurse the ability to take a break from playing these varied and often contradictory roles. Although the staff lounge can be considered to be an 'off-stage' space in which the nurse can safely turn off the role of nurse, being alone or hiding in Pod 1 further affords the nurse respite

from performing. In this instance the nurse is not only 'pressing pause' on playing the role of *nurse-to-patient*, but on the roles of colleague and co-worker.

A Place of Their Own

Although Pod 1 is not formally designated for the nurses' private use, it is very much a space that appears to be 'theirs'. In my time at the NICU, this is very often where the nurses took me to 'chat' or do anything in a more private setting, such as sign consent forms or discuss my research. As mentioned earlier, it is where they gather to have classes as well. I never once saw a family member enter the space. It seemed to me, as a guest, that it was a space that you needed to be invited into, or given permission to access. The sliding door was always kept closed and the lights were usually off or dimmed. Many of the nurses treat it like it is their own office, or their own personal space that they can use as they please (even though they are restricted by the fact that at times it is a care space). In a way, and at times, it is their territory.

Altman and Chemers (1984) define a territory as an object, place or area that is controlled, and used exclusively by an individual or a group. Closer to the concept of psychological ownership, Brown et al. (2005) define territoriality as "an individual's behavioural expression of his or her feelings of ownership toward a physical or social object" (p. 2). Although the nurses may exhibit a psychological ownership over Pod 1, they do not control or exclusively use it. The space is still very much shared and they let it go whenever, and as soon as, they are required to do so.

Pod 1 would be better described to be what Shortt (2015) has observed to be a 'micro-territory', or a space the nurses "commandeer…at various moments throughout the day…on which they like to stake claim and construct as informally 'owned' terrain" (p. 646). For Shortt (2015), a scholar of organizational behaviour, workspaces that are treated this way are *liminal spaces*[3]—spaces that are "not easily defined in terms of their use, are not clearly 'owned' by a particular party, and are where anything can happen" (p. 637). The acquisition of

[3] Shortt takes the idea of liminal spaces from Turner (1974).

liminal spaces is argued to afford respite from the pressures of daily life, as well as a sense of freedom from rules and conventions (Preston-Whyte, 2004; Shortt, 2015). I argue that Pod 1 affords this for the nurses, on an individual and collective level.

The Affordances of Pod 1

"The object offers what it does because it is what it is." (Gibson, 1986, p. 132)

We have established that Pod 1 affords the nurses a sense of privacy in a workplace that often leaves the nurse feeling overwhelmed, stressed, exposed, and unattached. But what is it about Pod 1 that affords the nurses this privacy? What gives Pod 1 its 'backstage character'? What about it communicates a 'turn-off-ability' and a 'get-away-ability'? What about this space, and/or the NICU, gives it its 'liminality'? In this section I will describe what I observed to be the qualities and characteristics of Pod 1 that afford the nurses the aforementioned experience of privacy, namely its location, its openness, and its availability.

Location

Pod 1 is located at the 'front' of the NICU. It is to the right, just as you exit the airlock that brings one into the unit, from the main hallway. It is directly adjacent to the front desk and a few steps away from the locker room and printer room. It is separated from what could be considered the entrance area of the unit, only by a sliding glass door. In the entrance area, people are constantly coming, going, and talking. It is where visitors (other hospital staff and the public) sign in before entering, where staff gathers at shift change, and where new infants stop to get admitted. It is at times busy and boisterous, and at others quiet and desolate. Although clearly an integral and central part of the NICU, it has quite a different feel than the rest of the unit, lacking the gravitas of the areas that can be found beyond it. The proximity to the entrance area, and to this lighter 'feel', gives the impression that Pod 1 is far away from the rest of the unit.

Pod 1's location in the entrance area of the unit also makes it seem far away in terms of physical distance. To get from Pod 1 to the next pod (Pod 2), requires walking all the way around the front desk, and down half the main corridor of the unit. This makes it feel segregated, or physically isolated, from the 'nursing', or 'caregiving areas' of the unit. This distance from the activity of the caregiving areas allows the nurse to not only distance herself from the 'stuff' of the unit, and its associated sights, sounds, and temperatures, but to hide from others. The nurse is physically distanced from the stressors— the noises, the clutter, the demands (of objects and people)—of her workplace. It offers the nurse a space that is not 'bing-bongy', where there are no alarms, no fussy babies, no parents, and no coworkers. They can close the door and not hear what is going on outside. They can go deep into one of the middle rooms during their break, sit/lay down on the bench or a chair, close the curtains, and get some sleep or, simply, some rest and alone time.

An Ambiguous Designation

Although technically, and clearly, a designated care-area Pod 1 is somewhat ambiguous in terms of its function. Due to the fact that it is, more often than not, 'empty' leaves it open to re-interpretation by the nurses. The space is available both in the sense that it is open and empty, and in that management allows it to be. If management decided that Pod 1 is out of bounds and absolutely, under no circumstances, to be used for anything other than the care of infants, then it would lose its availability. Pod 1, in its 'emptiness' and availability, is also extremely flexible. The fact that it is an ambiguous space, a space that is not necessarily one thing or another at any given time, gives it a flexibility that affords staff to use it as they see fit and for what they need. Its purpose can be easily modified to the immediate needs of the nurse(s), without much resistance.

Chapter Summary

In this chapter of findings I have argued that Pod 1, as a space, affords the nurses privacy in the workplace. I have painted a picture of the nurse as working

in an environment that is stressful, communal, and that often leaves her feeling exposed and unattached. I have described how the nurse uses Pod 1 to achieve solitude, isolation, rest, refuge, and sense of collective identity that is at times, much desired and needed. I have attributed the affordance of privacy to Pod 1's segregated and distant (feeling) location, as well as its ambiguous designation, which gives it a further availability and flexibility.

Chapter 5: The Warmer and the Hokki Stool

Introduction

The definition of technology differs according to the context in which it is being discussed. The English Oxford Living Dictionary defines it as "the application of scientific knowledge for practical purposes, especially in industry; machinery and equipment developed from the application of scientific knowledge" and "the branch of knowledge dealing with engineering or applied sciences" (Technology, 2017). In everyday conversation, when one refers to 'technology' one often is referring to the novel and innovative application of scientific knowledge —the latest device, the leading-edge development, or the experimental trial. A technology can be a material object, a technique, a strategy, or a system. Technology can be as 'invisible' as the internet and as tangible as the keyboard with which one types in a Google search. It can be as 'low tech' as the everyday walking shoe or as 'high tech' as the newest smart phone (Michael, 2000).

The NICU is a highly technological environment. It is as full of 'high' technologies (e.g. central monitoring) as it is 'low' technologies (e.g. the syringe). When I speak of technology in this thesis I am referring to the technological *object*. Technology, for the sake of this thesis, is tangible and serves a function (although not necessarily the intended one) (Verbeek & Vermaas, 2009). They are the material things "that actors use for instrumental and symbolic purposes" (Vannini, 2009, p. 4).

In this second chapter of findings I describe two everyday technologies found in the Grey Nuns NICU: the Giraffe infant warmer and the Hokki stool. Despite their ubiquity, these objects were described as particularly loved by the nurses. In the same vein as the description of Pod 1, I tell the story of how these technologies afford the nurse dignity and integrity, respectively, in their work.

The Overhead Warmer

A piece of equipment that can be found in virtually any neonatal unit is the infant warmer. The infant warmer is a piece of equipment that: a) holds the baby, b) keeps the infant at a developmentally supportive body temperature, and c) allows for the control and monitor of the infant's vital signs and the administering of medicines. It is a tall, somewhat slim piece of equipment primarily made up of four parts: 1) the base, or feet on castors which allow for it to be moved, 2) the body, which consists of a storage unit underneath a flat surface, underneath a convex surface in which the baby is placed, 3) the 'neck' of the piece, which supports and holds up the body, and houses the controls and information and, 4) a 'head', which encases a parabolic heater from which the heat that warms the child emits from. The head of this piece of equipment, which I will from here refer to as the overhead warmer (as the nurses do), curves away from the neck, or spine, almost like that of a doting mother who is lovingly gazing at her child. Figure 4 shows a Giraffe Warmer from GE Healthcare, which is not the exact model the Grey Nuns Hospital uses (although almost identical), but the same brand.

Figure 4. Giraffe Warmer. From https://www.gehealthcare.com/en/products/maternal-infant-care/warmers/giraffe-warmer

There are many infant warmers in the Grey Nuns NICU and the nurses use them on a daily basis. The infant warmer is usually provided to infants who have recently come out of the womb, need assistance maintaining a developmentally appropriate body temperature and therefore need to be kept in a more controlled thermal environment. For this reason, it is primarily found and used in the front pods (Pods 1, 2, and 3), as these pods are where the more acute cases are placed. That is, the infants in these spaces are not yet stable and require closer monitoring and more complex care.

GE Healthcare describes the warmer as designed to provide "a warm, comfortable, developmentally supportive environment for the baby" (General Electric Company, 2017, Giraffe Warmer). Benefits to the caregiver are stated to be the ability to stay cool and comfortable while working with the infant; safe and easy of access to the infant (due to a recessed heater design); more room to work (due to a space saving design); and, ease of use (General Electric Company, 2017, Giraffe Warmer). Based on these claims, it can be said that the warmer is designed to afford the nurse the experience of comfort on physiological, physical, and psychological (cognitive) levels (Slater, 1985). Like most technologies, it is designed to facilitate, or make better (faster, safer, easier, more understandable) a job, practice, or task.

My findings, however, suggest that the warmer does much more than make the nurse's job easier, safer, and more comfortable. In using the warmer, the nurse is afforded something more profound than safety and ease of use. In this section I will argue that in using the overhead warmer, the nurse is afforded autonomy, personal space, and ultimately, a sense of dignity at work.

Autonomy

During one of the interviews, one of the nurses told me that one of the things that they liked about the warmer was that the height of the crib could be adjusted according to the needs of the person that was using it (nurse or parent), which was not the case with the model of warmer they used in the past. The adjustability of the crib, on the new warmer, means that taller nurses can now

work on the infant without having to crouch down. One nurse stated, “there’s nothing worse than having to bend down, crouch down when you’re trying to do work, blood work or start an IV” (Int 2). Shorter nurses can lower it to adjust to their needs.

The fact that the nurse can adjust the height of the overhead warmer affords the nurse a level of control, or autonomy, over aspects of her experience of nursing that was missing with the old technology. The nurses now have some say in the conditions they will be working in, and a little more control over their bodies and their ability to protect it. They feel safer and a little less in harm’s way. Nursing is a physically demanding occupation and nurses are at high risk for musculoskeletal discomfort and injury (Davis & Kotowski, 2015). Studies have identified patient-handling tasks, such as bending down, to be associated with musculoskeletal disorders, specifically in the low back (Kuiper et al., 1999; Nelson & Baptiste, 2006).

Autonomy in the workplace, or job autonomy, is the opportunity to exercise control (Oldham & Kulik, 1983) or the power to act and make decisions (Lawler, 1986) in the workplace. Gagne and Bhave (2011) cite aspects of job autonomy as including the ability, or opportunity, to self–determine work methods (how one works), work schedule (when one works), context (where one works) and criterion (how job performance is measured). Autonomy is a need that must be satisfied in order for the employee to function optimally and has been related to increased worker wellbeing and positive work outcomes such as job satisfaction, job involvement, absenteeism, and performance quality (Gagne & Deci, 2005). For workers that work in hospitals, such as nurses, the experience of autonomy has a particular impact on job satisfaction, worker retention, and the perception of safety at work (Parker, Axtell & Turner, 2001; Larrabee et al., 2003).

Personal Space (Control)

This same nurse was also extremely impressed with the parabolic heater in the overhead part of the warmer. She liked the fact that it emitted a lot of heat, but was particularly smitten with the fact that the heat was focused on the baby and

did not land on the person handling the baby, whether that is a parent or a nurse. The heat is so focused, she stated, that parents standing right beside the warmer often worried about whether the baby was warm enough, not realizing the amount of heat that was actually being emitted to the infant. “You don’t have the intensity of the heat on you and its focused on the baby” (Int 1).

The fact that the heat coming off of this piece of equipment is focused on the baby and doesn’t spread beyond a certain area means that the nurse no longer has to be uncomfortable (sweaty and hot) while she is attending to the child. The nurses are no longer forced to enter and share a climate, or thermal environment, that not only is not intended for them, but also is misaligned with their physiological needs or comfort zone. Thermal comfort was found to be an important aspect of the physical hospital environment for hospital staff, in a study by Mourshed, & Zhao (2012). It has been particularly noted that in nursing work, thermal discomfort negatively affects work ability (Fischer at al., 2006).

Beyond this discomfort, or perhaps part and parcel of it is, the fact that there is a sort of intrusion of personal space occurring with the old warmer and the nurse. Personal space has been described as “an area with an invisible boundary surrounding the person’s body into which intruders may not come” (Sommer, 1969, p. 26) and as something one carries with them wherever they go (Sommer, 1959). Environmental psychologist Irwin Altman understands personal space to be less of an invisible boundary around the body, but more of a behaviour, or performed distance, with which people control how closed (distant) or open (intimate) they are to/with others (Altman, 1975). An intimate distance is kept when one is comfortable or open to someone/thing, while larger distances are kept when one is not comfortable/open to someone/thing (Hall, 1966).

Personal space is not limited to encroachment by people and objects, but also to sensory stimuli such as noise, smell, and heat (Dovjak, Shukuya & Krainer, 2014; Lewis, Patel, D'Cruz & Cobb, 2017). With the old warmer the nurse could not step away and create distance between herself and the heat’s ‘touch’ (Allen-Collinson & Owton, 2015), without stepping away from the infant

and making it difficult, if not impossible, to perform her job well. Because she has to care for the infant (and wants to), the nurse had no choice but to remain uncomfortable, and to feel, in a sense, that her personal space was being violated. The invasion of personal space has been shown to cause reactions in people that range from turning and/or moving away, to elevated stress levels (Sommer, 1966; Evans & Wener, 2007). Studies have described how, when physical distance cannot be increased, compensatory strategies are developed, such as retreating into conceptually private space (Szpak, Nicholls, Thomas, Laham & Loetscher, 2016; Lewis et al, 2017).

In the case of the nurses and the new overhead warmer, the 'focus-ability' of the parabolic heater affords them personal space, or the control of their personal space, back. Unlike the old warmer, it is not forcing them to enter into a thermal territory that they do not want to be in, or intruding on their personal space. It is not dictating their experience of nursing. On the contrary, it is allowing them the control they need over their own self and their body.

Dignity

In addition to 'loving' the overhead warmer because of its adjustability and focused heat, the same nurse also mentioned that she liked the new shape and form of the warmer, because it prevented potential injuries and allowed for easy access to the baby. The old warmer had a large projecting heat lamp that was almost directly above the infant. The height and position of it meant nurses (at least the taller nurses) would often bang their heads on the warmer while working with the baby. The warmer became an obstacle that the nurses had to work around, adjusting their body (often uncomfortably) in order to be able to work on the baby as required, and as they desired. It could be said that the new shape and form of the warmer, coupled with the new features of *adjustability* and *focus-ability* ultimately afford the nurse dignity.

Sociologist Andrew Sayer (2007a, p. 568) understands that "to be dignified or have dignity is first to be in control of oneself, competently and appropriately exercising one's powers". Dignity at work is about self-command and autonomy

(Sayer, 2007b). In part, it can be understood as the ability of a person to determine the circumstances of the situation or predicament he or she is in (Horton, 2004). As a concept it is positively related to feelings of worth, recognition, standing and status, and negatively related to a lack of recognition and/or being taken for granted (Sayer, 2007b). It can be violated or promoted through aspects of social relations such as dismissal, disregard, indifference, control and avoidance (Jacobson, 2012). Organization studies scholar Sharon Bolton differentiates between dignity *in* and *at* work, with dignity *in* work as relating to having meaningful work with a degree of autonomy, esteem, and respect; and dignity *at* work as relating to a physically healthy working environment and secure terms and conditions (2007).

With the old warmer, the nurses are in many ways subjugate to the needs of the infant, with their own needs and comfort taking a back seat. Perhaps, with this new warmer, the nurses feel valued and considered, knowing that it was designed with not only the infant's, but their own physical comfort and needs in mind. On some level, through the existence of and especially through the use of the overhead warmer, the nurses may feel that somebody is regarding, and values, their comfort and safety.

I do not mean to imply that the nurses otherwise go about their day feeling not valued or appreciated, but that in some small way, and on some embodied level the nurses' use of the warmer empowers them and *reminds* them that they are not only valued, but that they are recognized, and worthy of consideration. It is in their encounter with this technology that an understanding of their place, power, and value in the NICU is communicated and understood (O'Toole & Were, 2008). The interaction between the nurse and the overhead warmer can be understood to be a social one, in which the object's physical, sensory, and functional properties shape her own sense of worth or importance within the context of the NICU (Crilly, 2010).

The Hokki Stool

On my very first day of data collection an object caught my attention because: a) I didn't recognize what it was, b) I could not decipher what it was from looking at it, and c) it was unlike most of the furniture and equipment in this space. It was playful and whimsical in its colour and form. I thought it might be something for sitting on because of its shape and height. It was all one piece of extruded plastic, kind of in the shape of an upside-down wine glass. It had a cone-shaped base, a stem-type leg, and a flat seat. The flat 'seat' had a rubber pad on it and the base of the cone was convex and also covered in grey rubber. It was about 18" inches high (Figure 5).

Figure 5. The Hokki Stool. From http://www.bof.co.uk/projects/vale-glamorgan-council-cadoxton-primary-school

After a few days I noticed that there seemed to be one in every care space, usually by the chart desk. You almost couldn't help but notice it. It didn't have a very utilitarian look to it, in contrast to much of the furnishings and equipment in the unit. It had a label on it that said, 'do not go beyond 45 degrees', which also added to the mystery. In my notebook, I left a memo to myself to "ask about the orange blobby thing" (from my notes).

Eventually, I did ask a nurse what the 'orange blobby thing' was, and to my delight it was frequently mentioned in the walkthrough interviews I did with the nurses. It even came up a few times in casual conversation with nurses that were not participants in my study. The 'orange blobby thing' was a sitting stool, and they were purchased in order for the nurses to better facilitate mothers in the successful breastfeeding of their infants. While the stools are used as such, they are also occasionally used by the nurses to sit on while working at a desk, when performing long and awkward procedures on infants, as well as sitting around the chart desk chatting with other nurses.

One participant described the stool as "the greatest little thing" (Int1). In an attempt to illustrate why she loved it, an instance was described in which she had to perform a physically awkward procedure on a baby. The procedure required her to be very close to the infant (and to the mother that was holding him), as she needed to remove blood from his head. Not only did she need to get very close to the infant's body but, the procedure was going to take about twenty minutes and she needed to stay very still and in the same position for the duration. She used the stool as her support while she performed the procedure on the child. She opened her legs in order to get closer to the mother and infant and leaned in, closer still, to a spot, and into a position that was comfortable. The alternative to using the stool was placing the infant on top of the cart and having to crouch over the child, which would have been very hard on her back.

Similarly, another participant described the stool as "awesome" because it allowed her to "sit like a guy…and get up close" (Int 2) when helping a new mother breastfeed. Not only does the convex base of the stool allow the nurse to

lean far forward when helping a mother breastfeed, but the smallness of the seat, the lack of armrest, and the height of the stool all work together to give the nurses the freedom to spread their legs and bring their body as close to the mother as they need, in order to properly work with her and her baby. The stool allows the nurses to contort their body in order to get closer to the patient.

The sitting stool in question is actually a Hokki stool, by office and school furniture manufacturer Vereinigte Spezialmöbelfabrikenand (VS). Although not particularly designed for use in any particular setting it is most often used (and promoted by the manufacturer) as a seat for children in the classroom. VS describe it as, "an active stool [that encourages] freedom of movement…is liberating and increases the sense of wellbeing" (VS, 2017). From my observations and from conversations I had with nurses I would say that this is a valid assessment. In the same breath, however, I would also argue that it is an understatement of what this stool truly affords the nurse working in the Grey Nuns NICU. In this section I describe what I understand to be what the stool affords the nurse: freedom of movement and autonomy, physical intimacy and ultimately, integrity in her work.

Freedom of Movement and Autonomy

Nursing is a very physically demanding job (Menzel, Brooks, Bernard & Nelson, 2004). When not doing administrative work, the neonatal nurses in the Grey Nuns are either walking, running, listening, crouching, holding, leaning, reaching, bending over, or searching for something. I often observed them picking things up, putting things away, moving equipment, performing a procedure, and working with a mother and/or a baby. Although there are definite 'down times', neonatal nursing is very much a job that requires the full use of the nurse's body.

Despite the physical nature and demands of nursing practice, however, all of the chairs in the Grey Nuns NICU (other than the Hokki stools) are ones that you would typically find in an office: low or high chairs with backrests and armrests, cushioned seating, on castors, and with the ability to adjust the seat up, down, and around. They are ergonomically designed to support the back, the arms

and the legs in a seated position. Although designed to support the body, they are designed for a body that is working at a desk—a body that might need to slide over to grab a file and then quickly turn around to answer a phone or reach a pen. They roll, they swivel, and they lean back to limited degree.

Figure 6. The Hokki Stool in use. From http://vsamerica.com/lernwelt

The Hokki stool, in contrast, has a convex base, is armless and backless, and has a textured polypropolene seat and base. The convex base allows for the nurses to lean as far as their body and the stool allows, and in any direction they can, want or need to (see Figure 6 to see the Hokki stool being used, albeit not in a nursing context). The lack of armrest means that the nurses can open their legs as far as their bodies allow. The textured seat and base provide even further security and traction in whichever position they choose to be in. The nurses now can sit with their legs open wide (no armrests to block her). They can rock back and forth just by using their legs (the 'office' chair on castors would have propelled her backwards). They can lean forwards, backwards, and to the side. They can turn 360 degrees, using the stool as a pivot.

The nurses now have the ability to contort their body. Suddenly, they can open their legs wider, arch their back further and lean in even deeper (and closer). The stool acts almost like a third leg, a prosthetic limb of sorts, which is working with them to comfortably get into positions that would otherwise be unattainable. Although appropriate for some of the administrative (desk related) tasks involved in nursing practice, the office furniture in the unit is not appropriate for the physicality of the clinical and bedside practices involved in neonatal nursing. The range of motion it offers the nurse is too limited. These chairs are not designed for the aspects of neonatal nursing that involve getting 'up close and personal' with patients and getting (and staying) into potentially awkward positions.

Due to the simple, un-constraining design of the Hokki stool the nurse is afforded not only an increased range of motion or freedom of movement (as VS describes it), but also an increased sense of autonomy. Like the Overhead Warmer, the stool's design affords the nurses the ability to choose how they will perform their job and how they feel while doing it (their comfort level). In using the Hokki stool they are able to increase their mobility and choose whatever position they feel is comfortable and appropriate for the task at hand.

Physical Intimacy/An Embodied Practice

Nursing is also physical in that it requires a physical intimacy between the nurse and the patient. The practice of nursing can be understood as a kind of *body work*, or paid work that "takes the body as its immediate site of labour, involving intimate, messy contact with the (frequently supine or naked) body, its orifices or products through touch or close proximity" (Wolkowitz, 2002, p. 497). In discussing the *body work*, or embodied nature, of nursing, Jan Draper (2014) describes nursing as the practice of:

> Observing bodies; learning to 'read' them by searching skillfully for outward signs of inner goings on; cleaning and bathing bodies; medicating bodies; touching bodies; preserving body boundaries and employing great care to prevent and manage leakage and yet, conversely, sometimes purposefully breaking body boundaries to insert enemas, injections or

> nasogastric tubes; alleviating pain and then sometimes, of necessity, inflicting it; and then, a most powerful example of body work, the laying out of the dead body. (p. 2237)

Nurse and social scientist Ruth Malone (2003) understands that physical nearness between the nurse and the patient affords a further *moral proximity,* or a concern to 'be for' on the part of the nurse. Good, and moral, nursing is understood to be that which involves a physical intimacy with the patient body (Malone, 2003). It is often conceptualized as an embodied engagement between patient and nurse (Benner, 2000) and an embodied practice in which the body is the primary and ultimate instrument (Draper, 2014). Physical proximity and a being near, or with, the patient body is considered central to a patient–centred nursing practice (Malone, 2003). In the case of neonatal nursing, the nurse is in physical contact and engaging in a physically intimate encounter with not only the infant, but often also with the caregiving mother and father (Fegran & Helseth, 2009).

Integrity

The Hokki stool, therefore, in affording the ability to effectively use their body, and to get 'up close and personal', ultimately affords the nurses integrity in their work. Although very often understood as a psychological phenomenon (a mental state of being), integrity in this case is a sociological one, in which the nurses have the ability to practice their craft in accordance with the values and ideals of the nursing profession (Tyreman, 2011; Thomassen, Strand, & Heggen, 2017). These are values that, as we have discussed, are those that relate to an embodied and intimate practice. The ability to move, use, and extend the body in their practice provides the nurses the ability to do their job with integrity. In other words, they are able to practice according to what they understand 'good' and 'moral' nursing to be.

If I were to write a description of this stool in an effort to promote its features and value to the neonatal setting, I would say that the Hokki stool is an active stool that *liberates* the nurse's body so that they can practice nursing to

their fullest capability, and in the way (they believe) it is intended to be practiced. In using the Hokki stool, the nurses experiences integrity, in that they are able to extend not only their physicality, but also their care, and in turn, their *self*.

Chapter Summary

In this chapter I have described two technologies of the NICU, in terms of what they afford the nurse. The first, the Overhead Warmer, has been described as a technology that affords the neonatal nurses working in the Grey Nuns NICU autonomy in their job, control in the form of personal space, and ultimately a sense of dignity *at* and *in* their work. And finally, the Hokki stool, has been described as a technology that affords the neonatal nurse freedom of movement, a sense of autonomy, physical intimacy and ultimately, integrity. These findings, along with the preceding finding that Pod 1 affords the nurses privacy, will be discussed in the next chapter of this thesis.

Chapter 6: Discussion

Introduction

In this chapter I discuss the findings from this research. I begin with a brief summary of the study up until this point, before I take on the task of answering the research question of this thesis. From there I proceed with a discussion of the research findings, as they relate to previous literature. This is followed by a discussion around key issues and concepts that emerged from the study—findings that I believe have significant implications for the design and development of NICUs and NICU related products. The chapter ends with a brief outline of the strengths and limitations of the study.

Summary of Study

A review of the literature for this thesis concluded that despite the fact that there exists a large and ever-growing body of literature that is concerned with the experience of neonatal nursing, particularly as knowledge that can inform the design of NICUs, there is very little work that looks to understand how the neonatal nurse experiences the objects and spaces of his/her work environment. In response to this gap in the literature, this study set out, first and foremost, to explore how neonatal nurses working at the Grey Nuns Hospital experienced the material/spatial environment of their workplace. I wanted to know how the nurses talked about, felt about, encountered, used, avoided, and modified the material/spatial elements of their work environment. The rationale behind this being that this understanding could and would lead to valuable insights, not only regarding the nature and practice of nursing, but also the relationship between the nurse and the physical environment of the NICU. These insights are further understood to possibly serve as information, and inspiration, in the design and development of future NICUs and/or NICU technologies.

To this end, I conducted a descriptive case study of nurses working in one mid-level NICU in Edmonton, Alberta. Data was collected through a variety of methods: an artifact analysis of the NICU itself, walk-through interviews in which participants highlighted and discussed objects and spaces of their choice, and the observation (shadowing) of nurses while they worked. A purposive sample of eight Grey Nuns neonatal nurses participated in the study. Data from the study was analyzed by describing particular nurse–object/space relationships in terms of what they afforded, or provided, the nurse in her experience of nursing. This was done in order to tie the observations and interviews from the study into an object–focused analysis.

In this study I asked the following questions: How do NICU nurses experience the material/spatial environment of their workplace? Subsequent questions included: How do they interact with specific objects and spaces within the NICU? How have they modified the environment in order to make it work for them? What objects and spaces in the NICU are significant to them, and why? Finally, I was concerned with how their experiences relate to their values, needs, wants, desires, and expectations relative to the NICU environment.

Three relationships emerged from the data as particularly interesting and thematic: that of the nurse and Pod 1, the nurse and the Overhead Warmer, and the nurse and the Hokki Stool. In regards to Pod 1, what I found was that the nurses use Pod 1 as a space in which to hide, to rest, to sleep, to be alone, and to gather. It is significant to them in that, as a space, it affords them a place to 'get away' and 'turn off', as well as to feel they have 'a place of their own' (individually and as a collective). Ultimately, it was found that Pod 1 affords the nurses working in the NICU aspects of privacy, namely solitude, isolation, rest, refuge, and sense of collective identity, in a work environment that often leaves the nurse feeling stressed, exposed, constantly available, unattached and disconnected. This was found to be due to the pods distance from the action areas of the unit, its isolated quality, as well as its availability and ambiguous designation.

An analysis of the affordances of the Overhead Warmer determined that this technology, in its use, affords the nurses the ability to determine how they work and what works best for them while they are working. It affords them the ability to control access to their body and to their self, as well as the sense that they are worthy of consideration and respect. The findings describe a situation in which the overhead warmer affords nurses working in the Grey Nuns NICU autonomy in their job, control in the form of personal space, and, ultimately, a sense of dignity *at* and *in* her work. In describing the relationship between the nurse and the Overhead Warmer, dignity is illustrated as being about choice and control (autonomy) in how one works and in one's work conditions. It is related to feelings of worth, recognition, standing and status. It is described as something that is communicated, and that can be violated and promoted, given and taken away.

Finally, an analysis of the affordances of the Hokki Stool produced a description of a technology that affords the nurse freedom of movement and autonomy. More importantly, however, it was found that the Hokki stool, through this increased freedom of movement and autonomy, further affords the nurse working in the Grey Nuns NICU the ability to get intimate with, or physically close to, their patient. Physical proximity, or physical intimacy, is understood to be central to an embodied and hence a moral and humane nursing practice. Hence, it is argued that the Hokki stool affords the nurse who uses it, integrity in her work. In the description of the relationship between the nurse and the Hokki stool, integrity is illustrated as the ability to practice one's craft in accordance with one's own values and ideals of what good work is. It overlaps with the concept of dignity in that it is also about choice, control and a sense of autonomy. However, the concept differs with that of dignity, in that integrity is described less as something that is communicated, and more as something that is practiced. In sum, integrity is more closely related to the concept of morality, while dignity is more closely related to that to that of self-worth. Figure 7 provides a map of this thesis in which significant relationships, themes are visualized, as well as the inter-relationship of these.

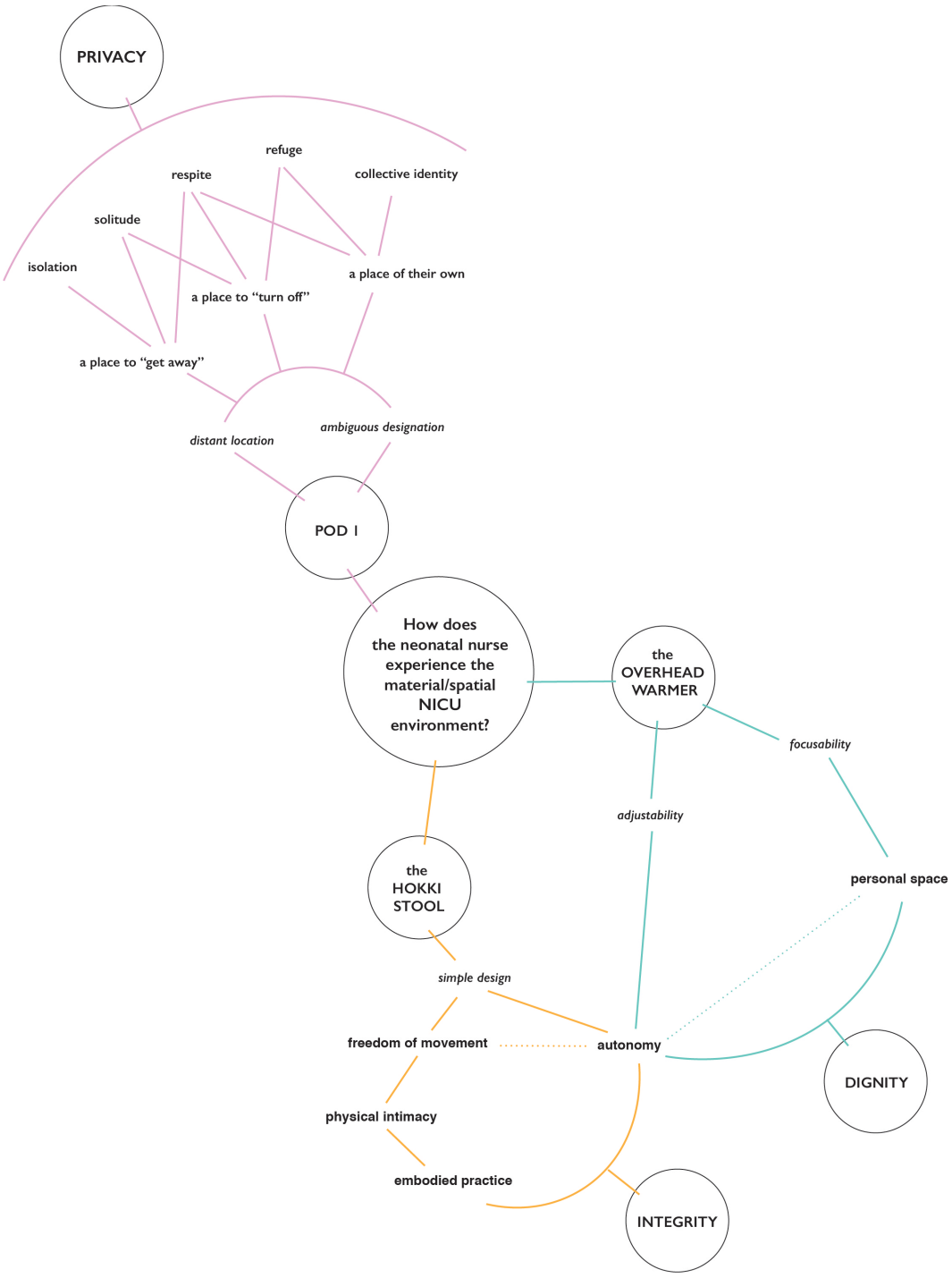

Figure 7. Themes and Relationships.

Answering the Research Question

As stated in the introduction of this thesis, the primary purpose of this research was to explore how neonatal nurses working at the Grey Nuns Hospital experience the material/spatial environment of the NICU. This exploration was done with the secondary purpose of better understanding the values, needs, wants, and desires of the nurses in relation to the designed NICU environment. In light of this, I will now answer the question I set out to answer. We can understand that an affordance is a complementarity between object and human. If an object affords a person something it is because they complement each other. The object is fulfilling a need, want, or desire. By definition then, we can understand that if Pod 1 affords the nurse privacy then it is because they need/desire this. The same is true for the Overhead Warmer and the Hokki stool: the warmer affords the nurses dignity and the Hokki stool affords the nurses integrity in their work because they need/desire it. They use Pod 1 because of the privacy it affords them. They love the Overhead Warmer and the Hokki stool, in part, because these items afford them dignity and integrity in their work (respectively).

Having stated this, however, the findings of this study should not be taken to mean that nurses working in the Grey Nuns NICU do not have, or are lacking in privacy, dignity, and/or integrity. To say that one needs or desires something does not imply that one is not receiving this at all. The findings of this study do not suggest that the physical work environment is not providing the nurse privacy, dignity, and integrity in other ways and on other levels. They findings of this study are showing us what the nurses value and what they need in their workplace. It is not telling us how much of it they are receiving or not. It is merely revealing to us what is important, desired and needed in the work life of the neonatal nurse.

Relationship to Previous Research

In this section I discuss the key findings of this research in relation to previous, and current research and theories in NICU design, material culture, and organization studies.

That Pod 1 Affords the Neonatal Nurse Privacy

That staff needs opportunities (and spaces) for privacy is acknowledged in the current NICU design guidelines, as well as in the literature that seeks to inform the design of supportive workplaces. This perspective is supported, for example, by White, Smith & Shepley (2013) who recommend that staff be provided areas that are limited to use by staff members. They suggest the inclusion of lockers, lounges, on-call rooms, and counselling, education and conference space in NICUs—with lockers and lounge rooms being the minimum requirement. Architect and NICU design researcher Mardelle Shepley (2004) recognizes that as much as nurses need stimulation (variation in job tasks, new education opportunities, and a view outside), they also need refuge from the sensory and emotional overload that comes with working in the NICU. In addition to staff-only work rooms and lounges, Shepley (2004) further suggests the inclusion of private (individual) retreat rooms or adjacent outdoor spaces with individualized seating, in which staff (nurses) can be alone, sleep, and really take a break. Shepley, leaning heavily on theories from environmental and behavioural psychology, further urges that, "the role of choice and control, territoriality, and privacy and personal space must be a consideration in the majority of design decisions" (2004, p. 300).

Despite the explicit recognition of the need for private spaces in facilities, and despite Shepley's call, there is very little, to no research that looks to better understand, the nurse's own experience of privacy in the NICU. There are no evaluations of particular NICU configurations/designs in relation to the nurse's privacy needs, or descriptions of how neonatal nurses use particular spaces (or elements) in order to achieve various levels, or aspects, of privacy for themselves.

This is in stark contrast to the extensive body of literature that is concerned with the privacy related needs and behaviours of other worker populations and workplaces, such as the office worker and the office space (Sundstrom et al., 1982; Sundstrom, Brown & Herbert, 1982; O'Neill & Carayon, 1993; Brown, 2009; Laurence, Fried & Slowik, 2013).

When the nurse's perception of privacy in the NICU is sought out in NICU related research, it is usually quantified and examined in regards to outcomes such as work quality or satisfaction and family satisfaction. For example, Watson, DeLand, Gibbons, York & Robson (2014) surveyed neonatal nurses for their perceptions of staff and family privacy after a move to new (SFR) NICU design. Other studies that link nurses and privacy in the NICU are ultimately looking to understand how the design of the NICU impacts the family's privacy in this space (Harris, Shepley, White, Kolber & Harrell, 2006; Cone, Short & Gaucher, 2010). What is usually being sought out is the nurse's observation of the family's experience and/or the nurse's perceptions of the physical environment's ability to provide (or act as a barrier) to family privacy. The research, instead of focusing directly on the nurse, is using reports and observations of experience and perspectives.

This focus on the family in much research is understandable, as the primary purpose of the NICU is to support the needs of the infant, and by extension the needs of the infant's family (White, 2011). The provision of privacy and private space for the infant and the family are considered essential considerations in the design of a neonatal intensive care environment that supports family–centred and family–integrated philosophies of care (Carter, Carter & Bennett, 2008). However, as discussed in the literature review, the nurse plays a pivotal role in the provision of family–centred care, and the physical environment plays an integral role in the nurse's ability to provide this care, not only on a functional/practical level, but also on a psychological and/or emotional level. A focus on the nurses' experiences of privacy—what aspect of privacy they want and need, how they achieve it, and what affords them this privacy—is therefore not only imperative to

understanding how to better fulfill the psycho/social/material needs of the neonatal nurse, but also to enabling the best care outcomes.

By describing how the nurses in the Grey Nuns NICU use Pod 1 to solve the problem of privacy, this research has moved beyond the theory that neonatal nurses working in an NICU need or desire privacy and provided evidence for the case. Beyond making a case for the importance of nurse privacy in the NICU, this research has painted a picture of the lived experience of the neonatal nurse working in the NICU, which as discussed in the literature review, fills a major gap in the NICU design literature. Most importantly, as it pertains to the appropriate and supportive design of NICUs, this research begins the job of clarifying and defining what privacy means for neonatal nurses working in these spaces, which at this point, there is little understanding of.

Requirements vs. Qualities

As mentioned in the previous section, it has been recommended in the NICU design literature, that in order to provide privacy for staff, NICU designs could include rooms such as staff lounges, on call rooms, isolation rooms, and even garden retreats (White, Smith & Shepley, 2013). These are theoretically sound suggestions based on concepts from environmental and behavioural psychology, such as territoriality, privacy, choice and control. But a staff lounge or locker room is not inherently a private space just by being, or being designated as, a private space. What should these spaces look, sound, smell, and feel like? Who should be allowed to enter and who not? What are the qualities and features that a private space such as a staff lounge or locker room, possess? Where should it be in relation to all of the other people, groups, objects, activities, spaces, and places in the unit?

Although there is a plethora of research that looks to answer these questions, either in general, or in specific locations (and populations) there is very little to no research that seeks to answer these questions specifically in relation to the NICU. Although there does exist a very recent interest in trying to inform how best to design supportive and therapeutic break-rooms for hospital staff (Nejati,

Shepley, & Rodiek, 2016; Nejati, Shepley, Rodiek, Lee, & Varni, 2016), this research is not specific to the NICU context or the needs and preferences of NICU staff. Moreover, these studies, by falling back on the same theories from environmental and behavioural psychology, do nothing to advance the understanding of nurse privacy and the nurse's experience of privacy in the NICU. They are only perpetuating and validating what is already understood to be best practice in NICU design.

A case study, such as this one, by describing the affordances of a space that the nurses use, in order to achieve privacy, begins to provide clues as to what privacy might look and (perhaps more importantly) feel like, in relation to the design of the NICU and NICU spaces. For example, the finding that Pod 1 is ambiguous, or has a liminal quality to it, is quite significant, in that it challenges what private space is understood to be. In fact, it challenges the idea that it even has to be a designed and designated space at all. Moreover, this research, in considering the affordances, or qualities, of a space that affords the nurses privacy, not only supports what is already known about how best to design a supportive and healing physical work environment, in particular when it relates to nurse privacy, but it also adds new insight into the qualities that provide this, and even more significantly, puts into question how the experience of privacy is conceptualized in NICU design. New questions and challenging insights are what, in part, is said to spur innovation and development (Norman & Verganti, 2014).

That the Overhead Warmer Affords the Neonatal Nurse Dignity

Dignity is a fundamental concept and value in nursing, in that it is understood that part of a good nursing practice is the acknowledgement and respect of the dignity of the patient (Bennett Jacobs, 2000; Cairns et al., 2013). Therefore, not unlike the concept of privacy, when dignity is looked at in the nursing literature it is most often examined in relation to the patient experience, as opposed to the nurse. There exists an extensive body of literature that has looked at the patient's experience of dignity in dying (Chochinov, 2002; Guo & Jacelon, 2014), in different care settings (Hall, Dodd, & Higginson, 2014; Baillie &

Gallagher, 2011), as well as particularly vulnerable populations and older adults (Jacelon, 2003). Studies that do link dignity and nursing are concerned primarily with the nurse's role and perspective, in providing patient dignity in care (Ariño-Blasco, Tadd, & Boix-Ferrer, 2005; Baillie & Gallagher, 2011).

In the neonatal nursing and NICU design literature, in particular, the concept of dignity is primarily reserved for the infant and the infant's family. It is linked to the neonatal nurse only in that it is something that must be provided to the infant and the infant's family, by the staff and in particular the nurse (Griffin, 2006). Dignity is understood to be a fundamental aspect of family–centred and family–integrated care (Beck et al., 2009; Ramezani, Shirazi, Sarvestani, & Moattari, 2014). Current trends in NICU design such as the single family room and family lounges are all intended, in part, to contribute to the family's experience of dignity in the NICU (Beck et al., 2009). In contrast to the concept of privacy, there is no mention of the need to consider the nurse's experience of dignity when designing for the NICU.

There does exist, however, a recent (albeit limited) recognition in the nursing literature of the nurse's experience of dignity at work. In their 2007 article, *Exploring the value of dignity in the work-life of nurses*, nurse researchers Lawless & Moss argue that:

> It is important that as a profession we seek to understand how dignity is constituted in the work-life of nurses not only because the presence or absence of nurse dignity may affect patient care but because dignity is a human right in any context, and because dignity is likely to be an important component of workforce health and have implications for recruitment and retention. (p. 235)

Consequent to this call for understanding, studies have found that nurse dignity is fundamental to nurse health, wellbeing, productivity and job satisfaction. A lack of dignity in the nurse's work life has been linked to feelings of anger, frustration, and cynicism; self-doubt, diminished self-esteem, depression, burnout, avoidance behaviours, changing jobs and even leaving the

profession (Burston and Tuckett, 2013). Although there are not many studies that explicitly study the nurse's experience of dignity in the workplace, the promotion and/or inhibition of dignity is often mentioned in relation to nurse wellbeing, productivity, recruitment and retention (Brunetto et al., 2013).

Current studies that look to better understand the professional dignity of the nurse have cited communication and respect in inter- and intra-professional relationships; teamwork; social recognition of competence (of general public and other health professionals); acquired competence (through education and experience); and, professional autonomy (Stievano et al., 2012; 2014) as factors in its achievement. In an attempt to better define the concept of professional dignity, as it relates to nursing, Sabatino et al. (2014) conducted a meta-synthesis of literature and found that the experience of nurse's professional dignity is in part intrinsic and in part socio-cultural. According to this study, professional dignity in nursing is attained (or lost) through intra- and inter-professional relationships, communications with patients and their significant others, and organizational characteristics such as management, workload, staffing, status hierarchies, income and work-life balance.

In both these studies, the elements that make up the experience of dignity for the nurse are all purely psychological, sociological, and/or cultural (organizational). It is portrayed as a human achievement, or an experience that, in some manner is provided to a person by another person (or group of persons). The physical environment is not mentioned, or even considered to be a player, or even a small factor, of this experience—much less an object. The physical environment is denied any agency in the nurse's experience of dignity.

The findings of my study, contribute to this scholarship in three ways: 1) it supports Lawless and Moss's (2007) call for a focus on the experience of nurse dignity, 2) it highlights the nurses, and in particular, the neonatal nurse's need for dignity in the workplace and 3) it contributes to the conversation about what constitutes the nurse's experience of dignity *in* and *at* work by suggesting that everyday objects of the work environment afford the nurse these experiences (and

by default, that they can also act to constrain them). By adding everyday technological objects of work to the list of 'factors' that promote and/or constrain these experiences, it challenges current conceptualizations of nurse dignity in the nursing scholarship. This research gives nurse dignity a material dimension, or 'materiality' (Latour, 1993; 2005).

Furthermore, the findings of this research paint a picture of neonatal nursing as a *sociomaterial* practice, one that is shaped by places, objects, bodies, and, infrastructures (Orlikowski, 2007). In the case of this research, the warmer, in its use, shapes not only how the nurses do their job but also how they understand their role and their place within the organization. The stool, likewise, shapes how the nurses do their job, and as will be discussed in the next section, it also plays a role in how they feel about the quality of their work, based on the values and norms of the profession.

That the Hokki Stool Affords the Neonatal Nurse Integrity

Unlike nurse dignity, nurse integrity is a very prominent concept in the nursing literature. As a concept it is often linked to the patient, yet a substantial body of work that studies integrity in nursing practice is reserved for the nurse's experience of integrity. Similar to dignity at work, a lack of integrity in nursing work is related to issues of stress, nurse burnout and hence, job satisfaction and nurse retention (Burston & Tuckett, 2012; McIntosh & Sheppy, 2013). Nurse integrity, however, diverges from the concept of nurse dignity in this literature in that it is more about the professional identity of the nurse, and of the nursing profession in general (Tyreman, 2011). Although the two concepts are often used in relation to each other, dignity in nursing seems to be more about the respect, worth and autonomy a nurse receives in her work, while integrity seems to be more about nursing practice and the ability to practice one's craft in a way that is ethical and moral, or within the professional values of nursing (Tyreman, 2011). Integrity is a more philosophical concept, or phenomenon, than dignity.

A literature review conducted by Burston and Tuckett (2013) suggests that factors that play a role in the nurse's experience of professional integrity (or lack

of) include individual characteristics like the nurse's personal traits and life experiences, site-specific variables such as resources (time and money) and staffing, and/or broader external influences such as health regulations, the law, organizational policies, procedures and standards, and other parties. This is similar to how nurse dignity is understood in the nursing literature, with the factors cited being either psychological, sociological, and/or cultural organizational. The physical environment, again, is not considered to be an agent in the nurse's experience of integrity in her work.

Also like nurse dignity, nurse integrity is virtually ignored in the NICU design literature. It is not mentioned in the NICU guidelines, and there is no mention of it, or at least not explicitly, in studies that have as their goal to inform NICU design. The closest thing to the concept of nurse integrity in the NICU design literature could be said to be that of nurse 'job satisfaction' or 'work quality' (Cone et al., 2010; Stevens, Helseth, Khan, Munson, & Smith, 2010; Bosch, Bledsoe, & Jenzarli, 2012). However, these concepts come from a different place than my definition of nurse integrity. They come from a Taylorist perspective, which although seemingly concerned with the health and wellbeing of the nurse, is more preoccupied with productivity, or outcomes, in the NICU.

In contrast to the phenomena of nurse dignity, there is some recognition in the nursing literature that integrity has a technological dimension. There is a section of nursing scholarship, in particular that which studies the ethics of nursing, that very much links the loss of integrity in the nursing profession to the use and adoption of technology (Barnard, 1997; Barnard & Sandelowski, 2001). In this body of work, technology is demonized for physically and emotionally distancing the nurse from the patient and from the heart of nursing (Malone, 2003; Blaxter, 2009; Draper, 2014). In the neonatal nursing context, in particular, the adoption of developmental philosophies of neonatal care can be understood to be, in part, a reaction to an over dependence of technology in early neonatal care (Sandelowski, 2000). The tension remains today, as technology is understood to be as much of a facilitator as a barrier to developmental and family–integrated care practices (McGrath, 2000; Kain, 2011).

The conceptualization of technology as playing a disembodying and distancing role in nursing practice is the polar opposite of the findings of my research. In my description of the nurse's interaction with technology, technology affords the nurses an intimacy with the patient and aids the nurses in performing their job in an embodied way, thus providing them with an experience of having performed their role and their job with integrity. The difference in theories might come out of the fact that the aforementioned school of thought, when studying or analyzing the relationship between technology and nursing is grouping all technologies together, in the same category. These studies are not examining technological objects, per se, but a large and general category of objects, systems, and strategies. They are not studying the specific technological object, or artifact, itself—how it is interacted with and perceived by the nurse.

What I have done, in this research, is to observe and analyze how nurses interact with and perceive of *particular* technological objects, in situ. In turn, what I think this has done is afforded an understanding that, because it comes from an object–centred place, challenges the view of technology in nursing as something to be fought, held at arms length, and mistrusted. Instead, I have described a human–technological relationship that is about trust, enhancement, and empowerment.

The findings of this research provide support for nurse researcher Margarete Sandelowski's championing of material culture studies as an appropriate and necessary perspective from which to better understanding the experience of nursing (2003). Moreover, they provide support for Sandelowski's (1996) position, which is that a formal object–centred (as opposed to technology–centred) inquiry

> of the distinctive purposes and inclinations of the various devices nurses use is necessary to discern which devices create the greatest pull away from what we conceive of as our purposes in the world and which ones move us closer to them (p. 13).

It is the case that in this research, it is the conceptualization of technology as artifact, or object, as well as a focus on the complementary relation between the nurse and the technology of the nurse's work life, that has allowed for a deeper understanding of, not only the experience of neonatal nursing in the Grey Nuns NICU, but of the values, needs, and desires that are part of this experience, and the role technology plays in it.

Implications for Practice

As discussed in the literature review, to describe something in terms of its affordances is to describe a relationship (and a complementarity) between an object and a subject. As has been illustrated in the findings of this study, the concept of affordances encompasses issues that move beyond strict ideas of function, to those of experience. Understanding why and how an object or a space affords a person (or a group of people) a particular experience is useful to design practitioners, in that it provides information, and/or inspiration, for the design and development of appropriate, meaningful, and sustainable products and environments.

The findings of this study describe what 2 particular technological objects, and 1 space, afford the neonatal nurse. In doing so it raises issues that should be of interest to not only those who design and develop NICUs, but also to those who design and market medical products and, effectively, anyone who is looking to design a healthy and supportive work environment. These issues revolve around the concepts of liminality, empowerment, and universality, and reach beyond the practice of NICU design, to product design, product marketing, and organizational strategy.

Ambiguity & Liminality

The findings of this research describe Pod 1 as affording the nurse privacy. Furthermore, it describes the affordance of privacy being afforded by the pod's 'turn-off-ability', it's 'get-away-ability', its 'backstage' character and its

'liminality', or ambiguous nature. It is even further suggested that these qualities are due to the fact that the pod is (for the most part) dark, quiet, empty, and has nooks in which one can hide. For the most part, however, it is attributed to location of the space in relation to the other areas of the unit, and the ambiguous designation of the space. As discussed in the previous section, the privacy of patient families and staff is considered a minimum requirement, in regards to what the physical environment of the NICU should provide. These findings, in particular the concepts of ambiguousness and liminality, could be of great interest to those who are involved in the design and development of NICUs, in particular as they relate to the design of private, or staff spaces.

The concept of the ambiguousness or 'liminality' of a space, the idea that the nurses find privacy in a space that they have appropriated, in a space that is even more private because it is not *actually* private (or intended for their private use), challenges the idea of what a private space is and looks like for the nurse. In fact, it challenges the idea that the answer to the provision of staff privacy, on an individual and collective level, is in the inclusion of a formal and designated private space, at all. Consequently, these findings could lead those who design NICUs to consider whether ambiguousness, flexibility, and 'liminality' can be designed into the physical environment of the NICU. These findings might have a designer consider leaving room in the design of the NICU for staff appropriation. They may make a case for a physical NICU design that is more adaptable and flexible. Or maybe it is not entirely a design question, and some of the answer lies in the way the organization itself manages and understands space. Perhaps the ambiguousness is not necessarily physical. It might also be social and/or organizational.

Empowerment

The findings of this research describe the Overhead Warmer as affording the nurse dignity at and in her work, and the Hokki Stool as affording the nurse integrity in her work. More specifically, it describes nurses who, in using the Overhead Warmer, feel valued and considered, knowing that the equipment was

designed with not only the infant's, but the nurse's own physical comfort and needs in mind. It was further observed that on an embodied level the nurses' use of the warmer empowers them and reminds them that they are not only valued, but that somebody is recognizing them as worthy of consideration. It is suggested that it is in this encounter with this technology that an understanding of the nurse's place, power, and value within the NICU, or the organization, is communicated and understood.

The idea that a workplace technology has the potential to empower, and consequently, disempower the nurse should be of great interest, primarily to the hospital organization that purchases and integrates these into their workplace, and also to those who develop and market NICU related products and equipment. They should be interested because it is in their best interest to have a nursing staff that is empowered and that feels that the organization cares for their wellbeing**.** An empowered nurse has been shown to be a nurse that exhibits positive behaviours such as increased motivation, risk taking, achievement orientation, and high career aspirations (Chandler, 1991). Casey et al. (2010) describe nurses who have experienced empowerment in the workplace as demonstrating increased involvement within their organizations, thus driving change in practice.

For nurses to feel empowered is good for the 'bottom line' of the organization. As was discussed in the previous section in regards to dignity, the empowerment of the nurse can result in decreased burnout (Laschinger, Finegan, Shamian, & Wilk, 2003; Manojlovich, 2007), decreased job strain (Laschinger et al., 2001; Manojlovich, 2007), increased trust in the workplace (Bradbury-Jones, et al., 2008; Laschinger, Finegan, Shamian, & Casier, 2000), and increased job satisfaction and work effectiveness (Casey et al., 2010). The finding that everyday NICU objects and equipment afford the nurse dignity and integrity (and the further implication that they can empower nurses) should be of interest to those who design and develop NICU related objects because it serves as a reminder of the impact the things they design have, not only on the lives of nurses but also, as just discussed, on the 'bottom line' of the organization.

As a designer myself, if I was involved in the design and development of NICU equipment, this finding might prompt me to consider taking a more human–centred and holistic approach to the design and development of these products. A human–centred approach is a design process that goes beyond trying to understand and accommodate to issues such as usability and ergonomics, and looks instead to investigate deeper human needs and values (Buchanan, 2001). The design and development of innovative products has been linked to the ability to understand these deeper needs and values (Dorst & van der Bijl-Brouwer, 2017). Furthermore, it has been suggested that, as a business strategy, a human–centred design approach provides economically beneficial market insights (Giacomin, 2017).

Universality

A key finding in this research is that the Overhead Warmer affords the nurse dignity, due to its *focus-ability* and *adjustability*. Another key finding is that the Hokki Stool affords the nurse integrity due to the *simplicity* of the stool's design. The fact that focus-ability, adjustability, and simplicity are the qualities of these products that afford the nurse dignity and integrity, suggests that it is ultimately the *universality* of these products that affords this. When I say that these objects and spaces possess a universality, what I mean is that they possess a sort of open–mindedness and an open-endedness, an ability to accommodate, a tolerance for diversity, and at the same time, a regard for particularity. In other words, these objects are less discriminatory. They are adaptable, flexible, and inclusive.

The idea that universality in design has the potential to afford nurses dignity and integrity in their work should be of significance to those who design and develop NICU environments. In particular, it should be of interest to those organizations that are committed to creating healthy, productive, and sustainable work environments for nursing staff. It makes a case for the provision of equipment, tools, and spaces that are adaptable, accommodating, and/or inclusive.

Neonatal nurses come in all shapes, sizes and ages, and with varying levels of experience and ability. Providing spaces and products that not only accept but

also accommodate for this diversity, should (in theory) contribute to a more satisfied, productive, and efficient nurse population. Perhaps more importantly, however, it has the potential to contribute to the development of a nursing population that feels empowered and recognized, or, as the findings describe, a nurse who feels that *somebody* cares. As was discussed in the previous section, this is not only good for the health and wellbeing of the nurse but for the 'bottom line' of the organization.

However, the nurse is no longer the only one who interacts with and uses the objects and spaces of the NICU. As was discussed in the literature review, neonatal organizations have adopted care practices that are looking to not just involve the parents in the care of the infant while in the NICU, but to integrate them and empower them in their role as caregiver. A family–integrated philosophy of care encourages not only the shared care of the neonate in terms of decision making and caring practices, but also the shared use of spaces, equipment, furniture, and product (Bracht, O'Leary, Lee, and O'Brien, 2013). These now must accommodate, and thus empower, not only the broad range of nurses who use them, but also a whole other complex and diverse population. Consequently, the idea of universality adds another user population, and hence a whole new set of needs and values, to understand and design for.

Strengths and Limitations of the Findings

In this section I discuss the findings of this research, in relation to their potential limitations, as well as their strengths. Issues around time and dynamics, researcher objectivity, and generalizability are discussed. The section ends with an argument for the value of case studies in the design process.

Time and Dynamics

I feel that I spent a significant amount of time observing the nurses interact with the objects and spaces of their work environment. It was significant, not so much in the sense that it was a particular amount of time, but rather that it was an

amount (and of a quality) that I feel allowed me to gain some deep insight into the culture and dynamics of the NICU. I collected data through multiple methods and went into the unit at different times of the day in order to get a more holistic sense of the phenomena under study. Nonetheless, it should be acknowledged that the Grey Nuns NICU is a necessarily complex and dynamic space, and that the things I observed and heard in the relatively short amount of time I spent there, is a sliver of the reality of the NICU and of the nurse experience. Moreover, the data collection phase of the research took place before, during and after the Christmas season, which may have provided a slightly skewed version of life in the unit.

Researcher Objectivity

This study was descriptive and therefore a highly interpretive endeavour that rendered it susceptible to researcher bias, especially due to the fact that I was a complete outsider (Hellawell, 2006). Despite the fact that the study was designed with reflexivity in mind, and the fact that I do feel that I was truly checking myself throughout the process, it is a possibility that my own preconceptions, past experiences, and understandings of the world may have crept in to some aspects of the research—from what I found interesting and salient during data collection and analysis, to the interpretation of the data.

Although the inclusion of a peer debriefing was initially discussed as being part of the research process, as a way to further support the credibility, reliability and validity of the findings (Houghton, Casey, Shaw, & Murphy, 2013) I chose to not include this for two reasons: 1) I understand analysis in qualitative research to be an individual, creative and unique process between the researcher and the data (Sandelowski, 2008; Cutcliffe & McKenna, 2004) and, 2) I don't think anyone else (especially someone that did not collect data along with me) would have interpreted the data in the same way (Sandelowski, 1993; Cutcliffe & McKenna, 2004). Having said that, my thesis supervisor did read my interview transcripts as well as periodically read (and discuss with me) writings from the initial stages of analysis.

Generalizability

Although appropriate to case study design, in this research I have examined a very particular, and small group of people working in a very particular environment. The findings of this research describe very particular relationships between nurses and specific objects and spaces within their workplace. As discussed in the methodology chapter, this could be understood to be a major limitation of the findings in that this does not allow for generalizability to other, or larger, populations. However, I have claimed that insights from this research can potentially inform the design and development of future NICUs (as well as other work products, environments and strategies). How can I claim this, when my research is interpretive, my research design a case study, my sample purposive, and my sample size small? How can the findings from this research be considered information, serve as evidence, or even be applied to design practice?

Although findings from case studies are not considered widely generalizable that does not mean that they are not useful to the design process. In their description of the value of case studies in design research, designers Martin and Hanington argue that case studies are holistic, and therefore can be understood to be "more advantageous than a reductionist study of parts, and that this depth compensates for any shortcomings in breadth and the ability to generalize" (2012, p. 28). Buchanan and Breslin (2008, p. 36) understand case studies as "useful tool(s) for research […] that focus on the transition between theory and practice". Knowledge and insights that come from case studies are considered particularly useful in the exploratory stages of the design process (Martin & Hanington, 2012). Although case studies are not direct links to design decisions, they can highlight phenomena, concepts, issues and themes in a way that can focus and inform the design process (Buchanan and Breslin, 2008, p. 37).

Chapter Summary

In this section I have discussed the findings of this research in relation to previous NICU design, nursing studies and organizational studies literature. I

further argue that the findings of this study, through the emergent concepts of liminality, empowerment, and universality, have implications for those who design and develop NICUs, those who design and market medical products, and, effectively, anyone who is looking to design a healthy, supportive, and sustainable work environment. Finally, I discuss the strengths and limitations of my study by arguing that although a case study is not generalizable it is valuable to design practice, and make a case for the validity of my findings.

Chapter 7: Conclusion

This is the final chapter. It consists of four sections: summary of the study, contributions, design recommendations and future research, and a conclusion. The summary of the study provides a brief overview of the thesis research herein. The contributions section outlines the scholarly contribution of this research, while the design recommendations and future research section highlights key insights and themes that I believe merit further consideration in relation to the material culture of neonatal nursing and the design of NICUs. Finally, a synthesizing statement is offered to capture the substance and scope of what has been attempted and discovered in this research.

Summary

The design of the NICU has evolved from an environment intended solely to provide optimal medical care and technology to the newborn, to one that acknowledges the role of the environment on not only the infant, but also the infant's family and caregivers (White, 2011). The neonatal nurse plays a pivotal role in the family–integrated and developmental care of the neonate, playing the role of teacher, guardian and facilitator (Reis, Rempel, Scott, Brady-Fryer, & Van Aerde, 2010) to the families of newborns in the NICU. Neonatal nursing can be an extremely stressful job, with nurse burnout and stress having a negative effect on patient safety, staff satisfaction and retention, and on the personal health and wellbeing of the nurse (Braithwaite, 2008). An efficient, healthy, safe, and satisfying neonatal practice, and hence the health of the neonate and the satisfaction of the parent, is contingent (in part) on the material/spatial NICU environment supporting the needs and goals of the nurse.

A review of the NICU design literature revealed that despite a large and ever-growing body of research that is concerned with the experience of neonatal nursing, particularly as knowledge that can inform the design of NICUs, there is very little work that looks to understand how the neonatal nurse experiences the

objects and spaces of her work environment. Very few studies actually look to the everyday objects and spaces of the NICU itself, as a source of knowledge and meaning— as they are perceived, encountered, used, modified, avoided and adapted by the nurses. It was argued that insight into the material culture of neonatal nursing, in particular an understanding of how the neonatal nurse experiences particular objects and spaces of the NICU, has the potential to inform the future design and development of supportive and appropriate NICUs and NICU related products.

The principle research question for this project is: How do NICU nurses experience the material/spatial environment of their workplace? Subsequent questions include: How do they interact with the objects and spaces within the NICU? How have they modified the environment in order to make it work for them? How would they redesign the components of the NICU if they could? How are certain objects and spaces in the NICU significant to them? What does this reveal about their values, needs, wants, and desires relative to the NICU designed environment?

A descriptive case study of nurses working in one mid-level NICU in Edmonton, Alberta was conducted in order to answer the research questions. Data was collected through a variety of methods: an artifact analysis of the NICU itself, walk-through interviews in which participants highlighted and discussed objects and spaces of their choice, and the observation (shadowing) of nurses while they worked. From the data, three particular relationships between the nurses and the objects and spaces of their environment were selected for analysis.

The key finding was that a space (Pod 1) primarily afforded the nurse privacy, a piece of equipment (the Overhead Warmer) primarily afforded the nurse dignity, and a piece of furniture (the Hokki Stool) primarily afforded the nurse integrity. The experience of privacy was afforded, in part, due to the location and liminal quality of Pod 1, while the experiences of dignity and integrity were afforded, in part, by the universal qualities that are possessed by both objects.

Contributions

This research supports the idea that privacy, dignity, and integrity are significant needs of the neonatal nurse. In regards to the nurse's need for privacy in the NICU this research clarifies and defines what privacy is for the neonatal nurse, a well as illustrates how the nurses seek out and solve the problem of privacy, through behaviour and the use of the physical environment. It adds new and valuable insight into the qualities that provide this, and even more significantly, puts into question how the experience of privacy is conceptualized in NICU design.

Furthermore, by suggesting that Pod 1 affords the nurse privacy due to its liminal quality, this research has provided a new way of thinking about hospital space and the physical provision of privacy. It challenges the idea of what a private space is and looks like for the nurse, as well as where to look for the answers of how to design an NICU that supports the nurse's privacy needs. Potentially, this critical insight, along with these new questions, could be asked of, and taken to, other nursing units and workspaces within the hospital environment.

This study has also contributed to the conversation about what constitutes the nurse's experience of dignity and integrity in and at work, by suggesting that the everyday objects of the work environment afford the nurse these experiences (and by default, that they can also act to constrain them). It challenges current conceptualizations of nurse dignity in the nursing scholarship by suggesting that this has a material dimension. In regard to the nurse's experience of integrity, it challenges the conceptualization of technology in nursing studies, and further identifies formal object–centred inquiry as a way of better understanding the nursing–technology relationship. Finally, this research contributes to scholarship by highlighting the connection between nurse empowerment and the universality of two products the neonatal nurse uses and interacts with on a daily basis,

suggesting that, potentially, the same connection could be made between the nurse and other healthcare related spaces and products.

Design Recommendations & Future Research

At this point, there is only one recommendation for the design of the physical NICU environment that I am willing to give, with absolutely no hesitation or prerequisite of further investigation. I would recommend, to all of those that are involved in the design and development of NICUs—the architects, the interior designers, organization heads, participating staff, etc.—to not forget about the nurse's need and desire for privacy, dignity, and integrity in their work and in their workplace. If there is one thing that this research has shown, it is that the neonatal nurse's experience is somewhat 'left behind' when it comes to trying to understand how best to design the physical environment of the NICU. It is my recommendation, not to make the nurses' needs top priority (as the infant will always be the most important 'stakeholder' in the NICU), but instead to give equal consideration to the needs, desires and experience of the NICU nurse, as is given to the infant and the family, both within research agendas and design decisions. As has been discussed, the health and wellness of the neonatal nurse is vital to not only the infant, but also the infant's family, in the circle of family–integrated care.

Having said this, there are a few key concepts and insights that I believe merit further investigation so that they can then better serve to inform the appropriate design of NICUs, for neonatal nurses, and nurses (and staff) in general. From a design perspective, I think it would be of great value to delve further into the nurse's use, acquisition, and/or appropriation of what could be considered liminal, ambiguous or flexible space in the NICU. An understanding of what spaces, or places these are, coupled with an understanding of why this is so, could contribute to some of the complex spatial issues in NICU design (and potentially, other health care spaces).

From a not-so-applied perspective, if I were to continue on the path that this research has started to carve out I would look further into the concept of the materiality, or material culture, of dignity, in particular as it relates to work and the workplace. This appears to be a concept that is relatively under studied and could potentially contribute to scholarship at the intersection of material culture and organization studies. Again, as with most material culture research, there is always some element that, by nature of its concern with the human/object relation, could potentially serve design.

Concluding Statement

As discussed in the literature review, it is well established that critical decisions in the design of healthcare facilities should be based on current and best evidence from research and practice. However, this approach to healthcare design, given the nomenclature of Evidence Based Design (EBD), is quite particular to what constitutes as evidence, or strong evidence, for design decisions. Qualitative, descriptive, and exploratory studies such as the one conducted for this thesis are not considered to provide strong evidence, or great value, to the EBD process.

The thesis project described herein denies this claim. It is proof that qualitative, descriptive, and exploratory approaches to research can provide valuable and useful evidence with which to guide the evidence–based design of healthcare environments. More specifically, it shows that a research approach that considers the objects in relation to users, particularly in the NICU, has the potential to lead to insights that we otherwise would not have had access to. It shows how a focus on objects and spaces, and what these afford, can reveal assumptions, and lead researchers and designers to question not only what and who they are designing for, but also how and why. Inside and outside of the context of evidence–based NICU design, this thesis is ultimately a testament to the significance of objects, the contribution of material culture studies as an

approach to inquiry, the materiality of the NICU, and, last but definitely not least, the humanity of neonatal nursing.

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Appendices

Appendix A: Artifact Analysis Guide Sheet

Artifact Analysis NICU	Date: Location: Start time: End time:
Layout/configuration	
Spaces (rooms, areas, closets, nooks, etc.)	
Sensory/Aesthetic (materials /textures, colours, sounds, lighting, ambience)	
Objects (a physical inventory: built-in structures, furniture, machinery, devices, tools, linens, decor, etc.)	
Signs of use (signs of wear, modifications, alterations, decorations, etc.)	
My thoughts/Other	

Appendix B: Observation Guide Sheet

Observation Guide Grey Nuns NICU

Date: Participant: Start time: End time:

Object/Space	Behaviour/Body	Quality	Activity	Environment	My Thoughts
	face gesture avoidance modification use other				

Object/Space	Behaviour/Body	Quality	Activity	Environment	My Thoughts
	face gesture avoidance modification use other				

Object/Space	Behaviour/Body	Quality	Activity	Environment	My Thoughts
	face gesture avoidance modification use other				

Appendix C: Interview Guide Sheet

Speculative Interview Guide

An interview based on "Talking Whilst Walking" (Anderson, 2004)

Due to the inductive nature of this research, where it involves doing an artifact analysis and observation before the interview, it is not possible to anticipate every question that may be asked during the interview. As such, this specultaive interview has been established to illustrate the kinds of questions that will be asked. Any alterations to this interview guide will be purely based on observations within the NICU at the onset of the study.

Introduction/Question #1
What I would like is for us to walk through the NICU together and as we are walking through could you describe each space to me, as well as the objects and technologies within it? I want to know what the spaces and objects are and what they are for, but mostly I want to know about your relationship with the objects and spaces within the NICU. What objects and spaces do you love? What objects and spaces do you wish you could change? What would the ideal be? Let's walk through the NICU and while you are describing the unit to me, point out any objects, devices, or spaces you would like to tell me about. Whatever you want to show me.

I'm going to take photos of the things and spaces you point out to me. Where would you like to start?

↳ We begin to walk around, and the participant begins to tell me what the spaces are, what they are for, and describing and pointing out objects, devices, furniture and tools, within it.

Question #2
What would you change about [INSERT NICU SPACE/OBJECT] if you could? What would you keep the same? Can you show me what you think the ideal would be?

Prompt: For example, can you think of any times or instances in which you thought, "I wish this object or space was like this, and not like this. Or did this and not this?"? Can you show me? What would the ideal version be like? What would it do? How would it work? What would it look/feel/sound like?

Question #3
What are your favourite objects/spaces in this space/the NICU? Imagine you were to write a love letter to this space/object/the NICU. What objects, tools, devices, walls, spaces, etc. would you include?

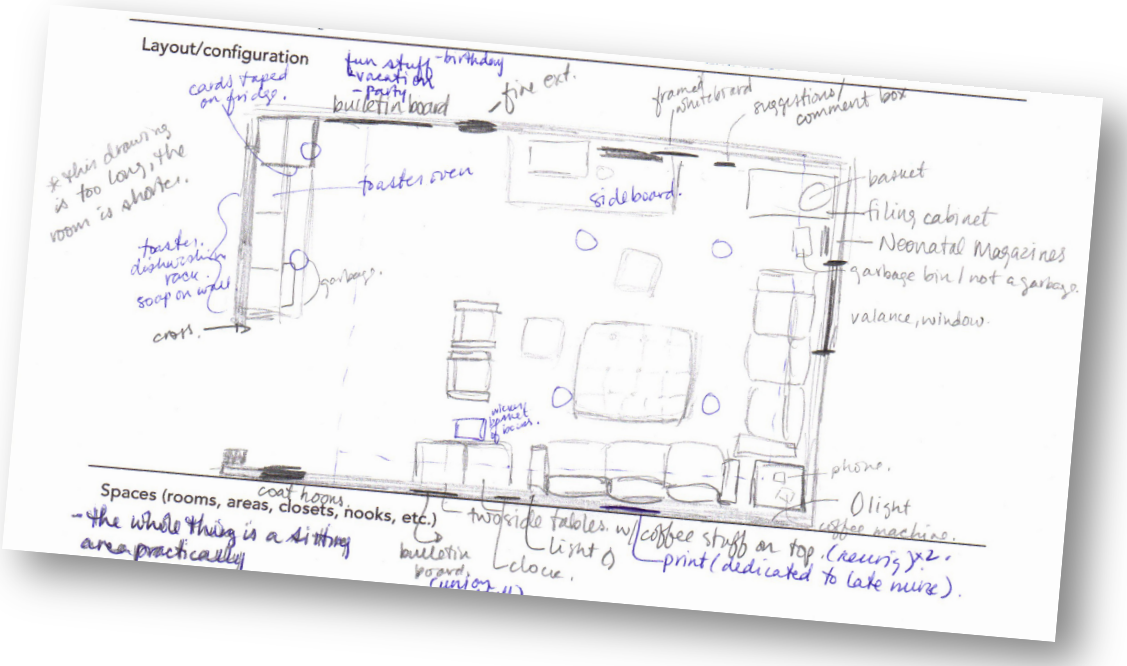
Prompt: How do I love thee NICU, let me count the ways... For example, "I love [INSERT RANDOM OBJECT/SPACE]. I love it because it helps me to..."

Question #4
What would the ideal NICU be like if it was up to you? What would you change about the layout? What would you keep the same? Why?

Question #5
Is there anything else you would like to show me or add?

Appendix D: Sketching

The following are examples of sketches made throughout the data collection phase of research, namely the artifact analysis and observation stages. Sketches allowed me to describe what I was seeing, quicker than I would have been able to in words. Descriptions of layouts, configurations, interactions, movement, and body positions were very often sketched, rather than written.



Appendix E: Photographs

The following are examples of photos taken throughout the artifact analysis and walk-through interviews. Photographs served as a form of documentation, but more importantly, as a way of 'taking me back' to the places and conversations I experienced during data collection. Being able to 'go back' was very helpful during the formal analysis phase of the research.

Appendix F: Mapping

Mapping was used as an analytic tool in this research. Using the map I had drawn during the artifact analysis, I attempted to synthesize what I had seen, heard, and experienced during data collection by drawing it out on the map. I utilized the layers in Adobe Illustrator so that I could put different combinations together—each combination telling a different story. In this example, the 'nude' layer is 'areas the families have access to' or 'family-friendly areas', the yellow layer is 'nurse areas', the blue dots are 'where the nurses gather', and the dark grey is 'spaces I never accessed'.