The primary intent of this research was to understand how staff nurses experience their workspace as it relates to the impact of the physical nature of their work on their bodies, the types of space on a hospital unit, the significance of other people in the space, and issues of time as it relates to nursing activities. This research study addresses a longstanding problem in healthcare design research, which is that hospital staff nurses and their experiences of the workspace are marginalized in the literature and in healthcare design research. This perspective challenges long-standing approaches and assumptions in Environment Behavior Studies (EBS) and architectural research about who to research, what to research, and how to research the person-environment relationship in healthcare design. Simply put, who I studied were staff nurses, what I studied was the relationship between the physical labor of nursing work and the physical environment of a surgical unit, and how I studied this relationship was with a research design that incorporated conventional qualitative research methods, feminist research methodology and an image-based method utilizing collage.

Evidence-based design is an approach to healthcare design that is informed by research data from a variety of sources (Hamilton, 2003). In addition to studying how the design of healthcare facilities affects patient outcomes (Ulrich, 2003), studies that focus on the hospital unit as a workplace are also needed. Instead of the nurses’ experience of their workspace being in the margins of person-environment studies in healthcare design, I gave the nurses’ experience a prominent position in this study.
For patients, the hospital is a place of healing while for nurses, the hospital is a place of work. Healthcare designers and researchers should be open to the likelihood that design solutions such as positive distractions, targeted to the healing body of the patient, will not have the same effect on the laboring body of the nurse. In order to go beyond the limitations that are posed by existing approaches and assumptions, I developed a conceptual framework from a post-structuralist feminist perspective that would help me understand nursing work and the spatial implications of nursing work. This study demonstrates the value of studying physical activities in order to understand the spatial aspects of the workspace. This study illuminates the physicality of nurses’ work and in particular the hidden and invisible activities such as searching and moving that are embedded within many of the caregiving nursing activities that nurses do on a surgical unit.

Searching is defined as when a nurse is looking for the medication, the supplies, or the equipment that she needs in order to complete a caregiving task. The activity of moving that I refer to here is meant in its most literal sense: walking as well as the body postures and movements that nurses do as part of caregiving activities. In addition, it is inclusive of moving objects such as supplies, equipment, carts, and patient furniture. This research also illustrates the need to understand the spatial implications for the resting activity of recovering from the physical aspect of nursing work. The activity of recovering is considered as when the nurses temporarily rest their bodies from the physical activity of the caregiving activities. Because of space limitations in this chapter, I will be discussing the research findings for the caregiving activity of searching and not the findings of moving and recovering.

For decades, studies have been done from an institution’s point of view for the purposes of improving the ‘efficiency and productivity’ of healthcare professionals in the hospital setting. In contrast to that, researchers need to study how the design of a hospital unit and the location of objects in that space impact the work experience of staff nurses. By objects in the workspace, I mean semi-fixed features (Rapoport, 1990) that include such things as medication carts, linen and supply carts, caregiving equipment, hospital room furniture, linen bins, IV poles and meal tray carts. Additionally, we need to engage in research methods that help us understand how nurses use their workspace from a nursing perspective that fits with their goals of ‘getting the work done’. What I mean by ‘getting the work done’ is being able to accomplish the assigned caregiving work by the end of one’s shift.
### Embodied Professionalism

I add the term *embodied to professionalism* to call attention to the physical nature of nurses’ work that is embedded in a nurses’ sense of professionalism in hospital nursing. The conceptualization of *embodied professionalism* illustrates the lived experience of doing a nurse’s job in a hospital setting: a hybrid of manual labor and professionalism, connecting the physicality of nurses’ work and the nurses’ objective to ‘get the work done’ with the intellectual and scientific component of nursing professionalism. Studying the nursing objective to “get the work done” includes looking at how nurses use their bodies to get the work done and how nurses needed to periodically recover from the physical labor of nursing work. In this study, embodied professionalism is how the professional nurse experiences the impact of the physical nature of the work on their *body*, types of *space*, the significance of other *people* in the space, and various issues of *time* as it relates to nursing activities.

### Research Design and Research Questions

The primary research question asks *how do the socio-spatial characteristics of three types of spaces in hospital nurses’ workplace and nurses’ experience of embodied professionalism shape one another?* The research methods employed provided findings that answered this question in regards to ‘getting the work done’ and the physical activities of caregiving (searching and moving) and resting (recovering).

The sub-questions posed were:

1. What are the nursing activities in each of the three types of spaces: the spaces of stationing, care giving, and resting?
2. How do these nurses define and evaluate embodied professionalism for themselves and for each other?
3. How do these nurses perceive the physical nature of their work impacting their bodies?
4. How do these nurses perceive the designed environment as affecting the physical nature of their work?
5. How do these nurses perceive the socio-spatial characteristics of their workplace as shaping different types of impression management behaviors and settings?
This research was undertaken on a surgical unit at a regional hospital in Nova Scotia, Canada. The surgical unit is divided into five smaller units and has several different types of patient rooms. There is a four-bed Intermediate Care Unit (IMC), which has patients who require close medical attention and cardiac monitoring. There is a section on the unit with seven beds for patients who are almost ready to return home but still require nursing care. The rest of the unit has a variety of private rooms, semi-private rooms, and two 4-bed wards. All of these patient rooms except for the IMC are segregated by gender.

This surgical unit was chosen for this study because the nurses on this unit frequently engage in physical labor, there is a high incidence of nursing injuries, the nurses work at a fast pace because of the nature of the work, there is no nursing lounge for the staff nurses, and, like many hospital units, this unit has a lack of storage space.

**Data Collection Methods**

A *heterogeneous purposive sample* of nine diverse female staff nurses was selected, which allowed for different viewpoints as well as commonalities among the nurses in experiencing their workspace. These nine nurses have different nursing credentials (LPN, RN and BN), and differ in age, length of time since graduation, and length of time they have worked on this unit. The nursing staff works in teams of two (an LPN and an RN). This is relevant to a study of embodied professionalism because of the extent of physical labor in the nursing work done by nurses with different credentials.

To discover how staff nurses experience their workspace, both conventional and non-conventional qualitative methods were used. Each research method was pilot studied and modified before being used in the field. Detailed architectural inventories of the fixed and semi-fixed features of the surgical unit space were conducted. Photodocumentation was done of all the spaces under investigation including the public spaces within the hospital that were used by the staff nurses. Often two to three data collection methods were used to help answer the research sub-questions. Multiple focused observations and *place-centered behavioral mapping* of the activities in the space were conducted in different parts of the unit as well as at different times. The place-centered method of behavioral mapping is when the observer stations him or herself at a particular place on the site in order to watch the behaviors and activities being studied. Samples of both specific activities and sample activities were obtained. The first site visit is when I did the interviews and collages; and after an analysis
of these, I knew in the second site visit what activities to observe, the goal of the activities and the parts of the activities. The sample activities were those, in which there was social dynamics that happened between the actors.

One-on-one structured interviews were conducted with each participant. Two types of location mapping corresponded with related sections of the interview: activity location mapping and impression management behavior location mapping. For each type of mapping, information was collected for both the 12-hour dayshift and the nightshift, on two separate maps. The participant was asked to look at both a floor plan of the surgical unit and a floor plan of the entire hospital as I asked her questions about three types of activities that she does (stationing, caregiving, and resting). The last three interview questions included the impression management behavior location mapping part of the interview. This time I asked questions about how the nurse acted in these spaces and if she acted differently according to who was present in that particular space. A five-tiered scale relates directly to Meyrowitz’s (1985) five levels of impression management behavior (forefront, front, middle region, back, and deep back).

After the interviews the participants attended one of four collage-making workshops to construct what I call an experiential collage (see Figure 1 for examples). After finishing the collage, the participant explained the meaning of each element that she used in her collage which served as a second interview. During the collage workshop I used a PowerPoint presentation to show examples of collages, collage principles, and collage construction techniques. All collage-making materials were provided and each participant was given the same open-ended theme for her collage, which was to ‘express the physical nature of your work as it relates to time and space.’ I used what is referred to as ‘magazine theme collage,’ which proved to be a very accessible type of collage for these participants (Leland & Williams, 1994).

In several ways, the collage method illustrated characteristics that can be considered integral to postmodern research methods: collage as a non-linear view of time; multiple methods of expression; inclusive of multiple variables and perspectives, and multiple meanings. The collage method is also aligned with characteristics found in feminist research methods: the collage is an expression of the participant’s voice; it tells a story; it illustrates socio-spatial experiences; provides meaning to the experiences; and provides a means of making the physical nature of nursing work visible.
Discussion of Findings: Searching Activities

An exploration of the searching activities illustrates that the surgical unit environment and the objects in the space are key factors in the nurses’ ability to fulfill their own professional expectations of getting the work done, which is to accomplish the caregiving work that one is responsible for by the end of her shift. I will discuss two key findings that emerged about the nurses’ experiences of searching as it relates to ‘getting the work done’ as well as the cognitive and embodied experiences of the design layout of the unit. The first is the difference between the nurses’ experience and the intentions of a centralized cruciform hospital unit layout. The second key finding is the multiple cognitive maps of the workplace that the nurses have as well as the patterns and rules of place that relate to searching travel plans.
Nurses’ Experience of the Cruciform Hospital Unit Layout: Not Centralized and Searching in Multiple Places

It was found that there are two major outcomes in how the nurses experience the surgical unit space that was designed in a cruciform layout with nursing support rooms located in the center of the cruciform. The first outcome is that the utility rooms are not experienced by the staff nurses as being centrally located, as indicated by how this was discussed in interviews. The second outcome is that the nurses report that they have to search for objects in multiple places, as discussed in both interviews and the experiential collages.

During her interview, Gina explained that a single task such as a dressing change requires several different supplies that are located in different places on the surgical unit. Her experience is that the supplies are located “all over the unit.” She stated that she would prefer that the supplies are located in one large area.

*And the physical layout......I find that everything is all over the unit,... like clean sterile supplies, I can’t see why they can’t be kept in one big area. To me it would be just better if you had it all in one big supply area, and then you’re only going to that one area, right? ...Gina, RN*

Viewed in plan, these irregularly shaped nursing support rooms appear to be in the center of the surgical unit (see Figure 2), but the staff nurses do not experience these rooms as being in the center. I propose that one reason that the nurses do not consider the surgical unit to be a centralized design is because the nurses do not experience entering and exiting the nursing support rooms from the center of the surgical unit.

The doors of the nursing support rooms do not face the nursing station, which is the physical center of the surgical unit (see Figure 3). Instead, the doors to each of the nursing support rooms open onto a corridor that radiates off the center. Hence, entering and exiting the nursing support rooms is from the corridors instead of the center of the unit. Dorothy states in her interview, that it would be good if the Clean Utility and the Dirty Utility rooms were in the “same wings,” implying that she experiences entering and exiting these rooms in different wings and not in the center of the surgical unit.
The surgical unit has objects that are difficult to find because their locations are fluid, ever-changing, and their location is dependent on several different variables. Hence, there are multiple places where the object being searched for could be. Jane explains, “It is never just a simple thing (finding what you need). Rarely is it where it is supposed to be. You go around the floor (the surgical unit), trying to see which patient is using it at the time.” Several nurses mentioned walking around the surgical unit as they search. The embodied nature of searching is such that the nurses do not only search with their eyes, but since they are in motion while they are searching, they search with their bodies too. There is no guarantee that the object being searched for will be in the first place that she looks. There is a high probability that a nurse will have to look in a second most likely place and maybe even a third most likely place. This was mentioned to me many times in both the interviews and during the collage explanations.
It’s still a hell of a pile of walking. We’ve got two utility rooms but sometimes what you need is in one, so you get part of the stuff there, then you go over and search in the other one, and it may not even be there. Then you have to go look in a third place…. You can waste a lot of time doing that….

Jane, LPN

In Janice’s collage, there is a color drawing of a woman standing in the center of a road that forks off in three directions (see Figure 4). The woman is scratching her head with her hand trying to decide which road to take with each one leading to a different door. Janice pasted objects in each doorway to represent the elements of a decision of which way to go. Janice says, “Nothing is in one area, even the supply rooms. The chest tubes are in one place and the suction set-up is in another.”

Using text and images, the mini-collage that Jane constructed tells a story about searching for something that she knows is out there on the unit, somewhere (see Figure 5). In the collage, there is an image of a woman searching in a bank of drawers, an image of a woman looking at a map, and a woman searching a shelving unit. Jane states, “Is it here?...I’ll find you.”
Most workers have a spatial memory for objects that they need in order to do their work, but there are two unique characteristics about the spatial memory that the surgical unit nurses are required to have. First, they must remember not just one but several cognitive maps of their workplace. A cognitive map is a mental representation of a person’s spatial knowledge of an environment (Kitchin & Freundschuh, 2000). The original design layout suggests that a nurse would have one cognitive map of her workspace but in actuality, a nurse is required to recall multiple cognitive maps of her workspace. Because the patient load is divided into groups of nine patients per nursing team, there are several different nursing care environments on this one unit (see Figure 6). This also means that there are several different sets of spatial relations between the nursing support rooms of the unit, the patient rooms on a particular wing, and all the rooms and routes. These were revealed through the location mapping done during the interviews, and the experiential collages.

Both the cognitive and embodiment components illustrate the connection between the mind and the body in order to ‘get the work done.’ The spatial memory of where an object is located in space is relative to the other objects in that space, and also relative to an overall framework for the objects or environment (Tversky, 2000). In my research, I found that the spatial decision-making that a nurse does while searching is dependent on her spatial memory of where the object will most likely be located and her cognitive maps. The nurses’ spatial memory of objects and space and the cognitive maps include the wing that she is assigned to that shift, every other wing on the surgical unit, the entire surgical unit itself, and the other units in the hospital. In addition, the nurses keep track of where different types of equipment is stored and where it could possibly be located in the surgical unit at different times of the shift.

On this surgical unit, supplies were likely to be stored in one to three nursing support rooms, but the equipment may be found anywhere on the unit. The spatial requirements on a hospital unit for the storage of patient handling equipment such as mobile lifting machines, wheelchairs, commodes, and shower chairs are often neglected (Victorian Work Cover Authority, 2004). Consequently such equipment is temporarily and often permanently stored in the corridors, in patient rooms and even the patient bathrooms. The same storage patterns exist on the surgical unit in my study. An example of how equipment can be stored in several different rooms on the surgical unit is that a
walker can be found in the Storage and Supply Room, the Storage Room, the Tub Room, in the alcove area of the East Wing corridor, or in any other corridor or patient room in the Surgical Unit. This means that a nurse must rely on having several cognitive maps for the multiple parts of her searching venture. A nurse would also need to know the spatial relationships between the utility rooms and the patient rooms of the wing that she is assigned to. These relationships would be different depending on which wing she is on because each wing has its own spatial relationship between the rooms of that wing and the nursing support rooms of the entire surgical unit.

Figure 6: Layout of each wing on the surgical unit
Figure 7: Wing nursing station zones (North, South, East, and West)

<table>
<thead>
<tr>
<th>Color</th>
<th>Semi-fixed Objects</th>
<th>Color</th>
<th>Wing Nursing Station Zones</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Medication Cart - typical parking spaces</td>
<td></td>
<td>West Wing</td>
</tr>
<tr>
<td>L</td>
<td>Linen/Supplies Cart - typical parking spaces</td>
<td></td>
<td>North Wing</td>
</tr>
<tr>
<td></td>
<td>Main Nursing Station and Wing Nursing Stations</td>
<td></td>
<td>East Wing</td>
</tr>
<tr>
<td></td>
<td>Permanent parking space – these objects can always be found here</td>
<td></td>
<td>South Wing</td>
</tr>
</tbody>
</table>
The second unique characteristic of the nurses' spatial memory is that there are underlying patterns and rules of place (see Figure 7). These were revealed through the location mapping done during the interviews, observations, and the photodocumentation of the research site. Despite all the challenges to the searching activity, there is some storage activity patterns of the semi-fixed objects that line both sides of the corridors and some obvious rules of place operating that help sustain these patterns. Canter defines rules of place as recurring relationships between human activity and the physical setting (Canter, 1991). This provides some predictability in finding particular objects and also provides a sense of order to one's workspace. You can see in Figure 7 that there are typical places in each wing around the nursing station whereby the medication cart and the linen cart are parked along both sides of each corridor when not being rolled down the corridor. This floor plan shows the permanent parking spaces for semi-fixed objects such as wheelchairs, stretchers, and IV poles. Additionally, there are also temporary corridor parking spaces along the edges of all the corridors. There are two types of equipment that are temporarily stored in the corridors: equipment that belongs to the surgical unit and equipment that belongs to other departments such as the dietary cart and gift shop cart.

The nurses’ approach to searching is what I call a searching travel plan. The searching travel plan represents a sequence of spatial decisions and all of the possible route choices that a nurse can make when searching for medication, supplies, and equipment. My findings indicate a nurse begins the search by first planning how she is going to find a particular object and determining the most likely place that the object would be.
Several of the nurses expressed aspects of the act of searching in their collages, such as looking for the best way to go, the best route to take (see Figure 8). Garling and Golledge (2000, p. 45-46) call this process spatial decision-making and claim, “choices of places (of) where to move precede choices of path which in turn precede wayfinding decisions.” In Gina’s collage, she used an image of a chessboard with white chessmen and dark silhouettes of men standing on empty squares (see Figure 8). Gina explains how this reminds her of her workspace, “You analyze the space - access the objects in the space and the other players (before you make your move). Which direction do I go? Which move do I make next? ...” As Garling and Golledge (2000) indicate, Gina is making a travel plan and deciding which path to take. The spatial decisions made by a nurse about where to search for the objects that she needs also takes into account whether it is the dayshift or nightshift and the time it is during the shift. The time of the shift is relevant because caregiving activities occur at specific times. For example, on this surgical unit patients’ baths are only done on the night shift.

Dorothy’s collage image implies a choice of path (see Figure 9). She uses an image of an intersection of two city streets to represent making a choice between paths. Dorothy states in her explanation, “Which way to go next?” Dorothy explained that the meaning of the detour sign and the ‘road closed to thru traffic’ also conveyed that one always “has to change direction.” A nurse tries to figure out where to begin searching and determines the most likely place that the object would be.

The Significance of the Searching Findings

This comprehensive study of searching activities illustrates that the physical setting in a surgical unit environment and the semi-fixed objects in that setting are a key factor in nurses’ ability to fulfill their own professional expectations of getting the work done. This exploration of the searching activity has provided much needed insight into understanding the complexities of nursing work and what an activity such as searching means to a nurse as well as how it fits with her goal ‘to get the work done.’ In both the interviews and the collage explanations, the comments about the searching activities are almost always coupled with comments about time. The activity of searching for medications, supplies, and equipment is viewed by the nurses as a ‘waste of time’ because of its frequency, the duration and distance travelled. Describing time in terms of distance is a way for nurses to measure time and space. The challenges and problems associated with the frequent task of searching are made worse by the duration of many of the searching activities. The hidden dimensions of searching, both the cognitive and
the embodied components, reflect aspects of embodied professionalism. Neglecting the activity of searching when studying nursing work marginalizes the physical labor of caregiving activities, and also ignores the time that it takes to search for equipment, to use the equipment, and to return the equipment to the space where it is stored. In other words, the issues of retrieving and returning need further study that is both detailed and an accurate representation of the issues.

The Benefits of Using a Feminist Post-Structuralist Approach to Analyze the Use of Space

The conceptual framework that I designed is from a feminist post-structuralist perspective and acknowledges a fluidity of categories, overlapping boundaries and the significance of presenting more than one truth or perspective. The post-structuralist approach that I have taken to analyzing nursing activities, the nursing workspace, and the objects in the workspace aids in better understanding the interconnected factors that explain how nurses experience hospital space. This approach allows for a more inclusive representation of the hidden aspects of caregiving activities such as searching and moving. The hospital unit is viewed through this lens as a collection of multifunctional spaces in which the nursing activities of stationing, caregiving, and resting occurs. By focusing on behavior and activities, a study of space can be inclusive of the time and body dimensions of these spaces as well as the nature of nursing work. Also, the variance of experiences and thoughts among the nurses is validated.

This approach helped illustrate existing patterns and characteristics about time, the body, the space, and the objects in the space. The way that nurses use this space may have been misrepresented if I simply categorized these elements into dichotomies and binary oppositions. For example, an analysis of the corridor on the nursing unit revealed the different types of activities that occur there, the overlapping workspace territories, and spaces where both permanent and temporary objects are stored or parked on either side of the corridors. These parking spaces are more of a ‘third space’ that does not fit into either the category of routes or the category of rooms. In this way the objects in the corridors are no longer invisible to researchers nor can they be easily discounted.
Another way in which a post-structuralist approach aided in interpreting the research findings was that instead of only viewing a space on a hospital unit as being either a patient space or a staff space as presented in the literature, it is acknowledged that the spaces are multidimensional and dynamic in nature. Many of the spaces on the surgical unit are multifunctional spaces that support an array of different behaviors at different times.

This conceptual framework illustrates how four significant components of nursing work experience interact with one another: the physical nature of nursing work and the impact it has on the nurse’s body, types of space, the significance of other people in the space, and various issues of time as it relates to the activity. A benefit of using a conceptual framework like this is that it illustrates that a dynamic set of variables all have an impact on one another.

**Conclusion**

This research has demonstrated that embodied professionalism which is inclusive of the physical nature of nurses’ work is an essential part of a hospital nurse’s conceptualization of professionalism in her everyday working world. While this research served the purpose of exploring nursing work and nursing space, it also challenged the limitations posed by dichotomous thinking when analyzing person-environment relationships in healthcare. The searching, moving, and recovery activity findings of this study have complex relationships and are inclusive of several variables. An analysis of space needs to be inclusive of the body, time and people dimensions of these spaces as well as the nature of the nursing work itself - the activities and behaviors that occur in these spaces. This study has demonstrated how a study of space is inseparable from human activity and the experience of that space. In particular, importance should be given to the hidden activities, those that are not measured or included in such inventories as work sampling.

Healthcare design researchers would benefit from educating themselves about the nursing profession. This is recommended in order to build on a knowledge base that is deficient in understanding how hospital nurses work, the relationship between nursing credentials and nursing work, and nursing professionalism. Healthcare design researchers do not so much need to do more studies on user preferences but rather, studies on how space is used and experienced. We need to develop more tools that can
help us understand the lived experience of people in space. Studies on nursing activities reveal much about how the hospital workspace is used and experienced. The exploration of embodied professionalism can inspire us to re-think our conceptualizations of the relationships between workers, working, and workspace. It can provide us with a lens in which to ask a set of conceptual questions about nursing workspaces and open doors to new approaches and perspectives.
References


