

New methods of researching healthcare facility users: the nursing workspace

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ABSTRACT: This study is entitled *Embodied Professionalism: The relationship between the physical nature of nursing work and nursing space*. The analysis is based in a critical examination of existing approaches, assumptions, and attitudes in the research literature about who, what, and how to study the person-environment relationship in healthcare facilities. New methods of studying how nurses experience their work, their workplace and the objects in their workspace are needed in order to address important issues of this person-environment relationship. Nursing work is re-conceptualized as *embodied professionalism* which acknowledges the interconnections between the physical labor of professional nursing work, time, and space. This is a qualitative case study of nursing activities on a surgical unit that are invisible, marginalized, and unaccounted for in the research literature. Instead of studying how nurses' efficiency and productivity could be increased through design interventions, this study examines the physical nature of nursing work and the physical setting from the nurses' perspective. Instead of viewing the healthcare facility as solely a place for healing, this approach views the healthcare facility as a place for working. A nurse's goal can simply be the desire to 'get the work done.' A qualitative research methodology and a mixed method approach is used in this study. The methods include structured interviews, location mapping, photo-documentation, architectural inventories, place-centered behavioral mapping, and focused observations. In order to get a better understanding of how nurses experience their workspace, an image-based visual research method, the *experiential collage*, was designed. The findings from using these methods reveal the significant role that the physical activities of moving, searching, and recovering play in gaining insights into nurses' socio-spatial experience of the nursing workspace.

Conference theme: Human context: social, cultural, and economic studies

Keywords: visual research methods, nursing workplace, healthcare design, qualitative research

1. INTRODUCTION

For the patients, the hospital is a place of healing; while for nurses, the hospital is a workplace. This study provides a conceptual framework of understanding nursing work and the spatial implications of nursing work. This study illuminates 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. This study demonstrates the value of studying physical activities in order to understand the spatial aspects of the workspace.

Evidence-based design is a recent approach to healthcare design that is informed by research data from a variety of sources (Hamilton, 2003). Evidence based design is used to create healthcare facilities that improve patient outcomes (Ulrich, 2003). In addition to studying how the design of healthcare facilities affects patient outcomes, studies that focus on the hospital unit as a workplace are also needed. For decades many 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 and typically that is what is studied when analyzing the person-environment relationship in healthcare facilities. Adam (1995) states that being efficient is "to produce something or to perform a task in the shortest possible time" (p.100). Weiss et al (2002) define efficiency as "producing more in less time and with fewer resources such as personnel and equipment" (p.107).

However, we 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. In particular, we need to use research methods that help us understand how nurses use their workspace from a nursing perspective which fits with their goals of 'getting the work done'. What is meant by 'getting the work done,' is being able to accomplish the caregiving work that one is assigned by the end of the shift.

We can learn about how a space is experienced by nurses by studying the *activities* and *behavior* that occurs in the space as well as its meaning and

significance. This study demonstrates the value of analyzing the physical activities that nurses do in order to understand the spatial aspects of the workspace. Conversely, there is value in studying the spatial aspects of the workspace and the objects in the workspace in order to understand the activities.

1.1. Embodied professionalism and the research question

The socio-spatial relationship that I call *embodied professionalism* calls attention to how the physical nature of nurses' work is embedded within the nurses' sense of professionalism. This is how professionalism manifests itself in hospital nursing. Embodied professionalism is a hybrid of manual labor and high-level professionalism, connecting the physicality of nurses' work and 'getting the work done' with the intellectual and scientific component of nursing professionalism. It is about "getting the work done" and how the nurses get it done – by doing the work, by laboring, by working together, by using their bodies to do their work. It is also about the need to recover from the physical labor of the work. The role that design plays is central to nurses' ability to fulfill their own professional expectations of 'getting the work done.' In this study embodied professionalism is how the professional nurse experiences her lived body in relation to space, the objects in the space, the people in the space, and time.

There is one major research question driving this research inquiry. 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?* Because of the nature of the relationship that the staff nurses have with their physical workspace and the semi-fixed objects within it, the three major findings of *searching*, *moving*, and *recovering* provide answers to this question. The caregiving activities of *searching* and *moving* illustrate the physical nature of the work while also needing the resting activity of *recovering* from the physical aspect of nursing work.

1.2. Research design

This research was undertaken on a surgical unit at a regional hospital in Nova Scotia, Canada. The 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, and this unit does not have a nursing lounge for its' staff nurses. Another important consideration was that the nursing staff is comprised of nurses with different credentials which includes LPNs, RNs, and BNs. This was important for a study on an embodied professionalism because the data includes different types of physical labor involved in caregiving activities.

A *heterogeneous purposive sample* of nine diverse female staff nurses was selected, which allowed for different viewpoints as well as some commonality 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 that they have worked on this surgical unit. In 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.

This surgical unit is divided up into five smaller units and has different types of patient rooms and the unit. 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.

2. DATA COLLECTION METHODS

2.1. Overview of data collection methods

To discover how staff nurses experience their workspace, both conventional and non-conventional qualitative methods were used. Detailed architectural inventories of the fixed and semi-fixed features of the surgical unit space were conducted. As well, photo-documentation was done of the surgical unit and the public spaces in the hospital that the nurses frequented such as the gift shop, art gallery corridor, and the cafeteria. As Table 1 indicates, more than one data collection method was used to help answer the research sub-questions. The methods of inquiry included one-on-one structured interviews, two types of location mapping during the interview, photo-documentation, and focused observations. Each participant was asked to construct what I call an *experiential collage*. Each research method was pilot studied and modified before being used in the field.

The interviews and the experiential collages proved to be useful in helping answer all of the research sub-questions. The location-mapping instrument helped with answering the fifth sub-question about the socio-spatial characteristics of their workplace as shaping impression management behaviors in different settings. The instrument was especially helpful in generating where nurses do various nursing activities and in which spaces these activities occur.

2.2. Interviews and location mapping

Each participant was required to commit to a three-part process that included the initial interview with two types of location mapping, a collage workshop with the construction of a collage, and finally, the collage explanation meeting. The in-depth, one-on-one structured interviews in the research study lasted from one to two hours. The interview included two types of location mapping: *activity location* mapping and *impression management behavior location* mapping. The maps were miniature copies of blueprints of hospital floor plans. There were two types of 8.5" x 11" miniatures: the surgical unit floor plan layout and a floor plan layout of each hospital floor.

Table 1: The relationship between the research questions and the data collection methods

PRIMARY RESEARCH QUESTION	
<i>How do the socio-spatial characteristics of three types of spaces in hospital nurses' workplace and nurses' experience of embodied professionalism shape one another? How do these characteristics operate?</i>	
RESEARCH SUB-QUESTIONS	DATA COLLECTION METHODS
1) What are the nursing activities in each of the three types of spaces: the spaces of stationing, care giving, and resting?	Individual interviews Location mapping by participants during interviews Experiential collage Observation Place-centered behavioral mapping
2) How do nurses define and evaluate embodied professionalism in themselves and each other?	Individual interviews Experiential collage Observation
3) How do nurses perceive the physical nature of their work impacting their bodies?	Individual interviews Experiential collage
4) How do nurses perceive the designed environment as affecting the physical nature of their work?	Individual interviews Experiential collage
5) How do nurses perceive the socio-spatial characteristics of their workplace as shaping different types of impression management behaviors and settings?	Individual interviews Experiential collage Location mapping by participants during interviews

Each interview began with several basic demographic questions which asked about the participant's nursing credentials, number of years since graduation, age, how long she had worked on the surgical unit, and what types of hospital units had she worked on besides surgical. A set of ten interview questions followed, each with several sub-questions and probes. The first two interview questions asked how she judged whether or not she was doing a good job and how she judged whether or not another nurse was doing a good job. The next two questions asked what nursing activities did she consider to be physical labor and did she experience restrictions on being able to go to the bathroom, eat, or have a drink when thirsty.

The next three interview questions included the *activity location mapping* part of the interview. Two types of location mapping corresponded with related sections of the interview. For each type of mapping, information was collected for both the 12-hour dayshift and the nightshift, on two separate maps. Each of these questions asked if there was anything about the physical space (the layout of the unit, the size of the space, the furnishings, etc.) that influences how she acts in the space. The participant was asked to look at both a floor plan of the surgical unit and a floor plan of the entire hospital while she answered questions about three types of activities (stationing, caregiving, and resting). She was asked what activities she did in these places and to place a colored sticker on the floor plans

to indicate where she did these activities. Small round colored stickers were used: red for stationing, blue for caregiving, and green for resting. She was asked to point out where the nurses listen to the change-of-shift report and where the medication carts are parked in the corridors. The participant was also asked to indicate where else in the hospital she carried out these activities and to place a corresponding colored sticker at those locations.

The last three interview questions included the *impression management behavior location mapping* part of the interview. These questions again related to stationing, caregiving, and resting spaces. This time questions were asked about how the nurse acted in these spaces and if she acted differently depending on who was present in that particular space, the time of day, the shift, the week, the season, and the physical space. An explanation of the 5-part sticker legend was provided and the participant was asked to assign numerical values between 1 and 5 to the ways she acted in these three different spaces. Five was the most formal (most professional) while 1 was the least formal (least professional). This five-tiered scale relates directly to Meyrowitz's (1985) five levels of impression management behavior (forefront, front, middle region, back, and deep back). The participant was asked to write the number on a yellow sticker and place it on the floor plan on the space where she would do this particular activity. There were both dayshift and nightshift floor plans. For each space of stationing,

caregiving, and resting, the participant was asked to place stickers with the numbers in the activity space on the floor plan.

2.3. Experiential collages

After the in-depth interview, the participant signed up for a collage workshop and was asked to construct an *experiential collage*. I call this collage an experiential collage because the theme of the collage is about the nurse's socio-spatial experience of the physical nature of her nursing work. The interviews provided an opportunity for the nurses to say what they *think*, and through observations the researcher is able to see what the nurses actually *do*. However, the collages provide insights into how a nurse actually *feels* about what she thinks and what she does as well as what it *means* to her. The process of constructing the collage provides a nurse with a block of time devoted to reflecting upon her own different perspectives about the socio-spatial nature of nursing work *visible*.

The collage method was designed to achieve the above objectives. Unlike the ZMET collaborative experiences of the physical nature of her work. Finally, the collage provides a means of making method (2002), the participant constructs the collage by herself without assistance from the researcher.

Unlike the collage method employed by Williams (2002) it is not meant to be used in a group discussion. At the beginning of the collage workshop the participants were shown examples of collages, collage principles (metaphor, scale, literal representation, etc), and collage construction techniques. Then each participant spent approximately two hours making her collage. All collage-making materials and a large variety of magazines were provided. Each participant was given the same open-ended theme to base her collage on, which was to 'express the physical nature of your work as it relates to time and space.' This type of collage is often referred to as a 'magazine theme collage,' and has proved to be a very accessible type of collage for participants (Leland & Williams, 1994; Williams, 2002). Several participants personalized their collages by creating a *story* that had smaller pieces to it

and often included a few smaller collages (what I call mini-collages) within the larger collage (see Figure 1). After completing her collage, the participant was asked to explain the meaning of each image and each piece of text in regards to the theme of the collage. Several questions about the process of making the collage were asked and a written record was made of the participant's explanation of her images and text. The primary purpose of the collage explanation meeting was for the researcher to come away with a clear understanding of what the participant was trying to express in her collage as it related to the theme.

2.4. Architectural inventory

Informal observations of the surgical unit were conducted to understand the spatial layout and the relationship of the spaces to one another. Photography was used as another method of observation and documentation of the physical characteristics of the surgical unit. Photographs were taken at different times of the day and on both site visits. Photographs of all the rooms and corridors on the surgical unit were taken to visually document the fixed and semi-fixed features of three types of activity spaces (stationing, caregiving, and resting). Photographs of the interior spaces of the hospital were also taken to become familiar with the location of the cafeteria, elevators, main staircase, courtyard, vending machines, chapel, gift shop, museum, and the nurses' locker room with showers. Photographs of the exterior spaces of the hospital were taken to become familiar with the location of the entrance to the hospital, the designated smoking areas for staff, parking lots, the helicopter landing pad, etc.

2.5. Observations

In the second stage of the study, focused observations of two caregiving nursing activities were conducted: *searching* and *moving*; as well as the nursing activity of resting and *recovering*. Also, the social dynamics among the staff were observed as well as the impression management behavior in the three activity spaces (stationing, caregiving, resting).



Figure 1: Janice's collage and mini-collage expressing searching for supplies (Keddy, 2006)

There were two types of observation checklists designed for observing and recording: the *sample activities observation checklist* and the *specific activities observation checklist*. The first type of observations was focused on the nurses' movement in space and in particular, the activities of moving. How the nurses moved in the corridors and utility rooms of their environment was observed and in particular how they moved different types of objects around in their environment. How the nurses carried small objects on their persons and how they interacted with larger objects such as patient transfer equipment and patient room furniture was also observed.

The second type of observations was focused on recording and observing specific caregiving nursing activities that the nurses talked about in their interviews and collages such as moving patients from one room to another on the surgical unit. This *Specific Activities Observation Checklist* was designed for these observations. Both checklists included spaces to make notes about the activity spaces and their locations, the date and shift, the start and finish times of the observation, the fixed features of the space, and the semi-fixed features (furniture and equipment). There was also a space on the sheet to sketch the location of the semi-fixed features that occur in the activity space such as the hampers, medication cart, linen cart, and recliners. At the bottom of the checklist was a space for comments and impressions. The *Sample Activities Observation Checklist* had a second sheet with spaces for the time, activity, actors, and social dynamics. This included verbal interaction and non-verbal expressions. The second sheet of the *Specific Activities Observation Checklist* had a space to write the purpose of the specific activity being observed and a space to write the parts of that activity.

These observations occurred at different times of the shift, for different durations of time, on both the dayshift and nightshift as well as on both the weekday and the weekend. These observations included three types of activity spaces (stationing, caregiving, and resting), the actors, the physical nature of the nursing activities, the fixed and the semi-fixed features, the social dynamics between the actors (impression management behavior), and the body expressions of the actors in these activity spaces. The semi-fixed features of space have four levels: portable, design finishes and hardware, adornment of space, and inhabitation of space. The inhabitation of space is further broken down into institutional artifacts, personal artifacts, and gifts to the nursing staff.

The three types of activity spaces were observed on the surgical unit, regardless of whether the spaces were designed for these activities or not. *Place-centered behavioral mapping* was used for observing how the participants used these three types of activity spaces. Sommer and Sommer (1997) define a behavioral map as a "chart of individuals' locations and movements, how they actually distribute themselves in a particular area or location" (p.358). As they point out, a behavioral map illustrates where and what behaviors actually occur which may contrast with what was

planned for the space. A place-centered behavioral map is one in which the observer stations him or herself in one place to watch what is happening for a specific period of time (Sommer & Sommer, 1997). Behavior mapping has been used previously in health care settings to measure activity (Esser, Chamberlain, Chapple, & Kline, 1967; Field, Hanson, Karalis, Kennedy, Lippert, & Ronco, 1971; Fisher, 1982; Ittelson, Proshansky, et al, 1967; Kennedy, Fisher, & Pearson, 1988; Trites, Galbraith, Sturdavant, & Leckwart, 1970).

The place-centered behavioral mapping done in the corridors and nursing stations were not limited to observations about the nurses' locations, movements, and behaviors. The locations of objects in the corridors were also noted such as the medication cart, the linen hamper, recliner chairs, the linen/supply cart, wheelchairs, and stretchers.

3. CONCLUSION

As stated in the Introduction, 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 three major physical activities of *searching, moving, and recovering*.

An exploration of *searching activities* illustrates that a surgical unit environment and the objects in the space are a key factor in nurses' ability to fulfill their own professional expectations of *getting the work done*. Neglecting the activity of searching when studying nursing work inadvertently denies the physical labor of the activity, and also ignores the *time* that it takes to search for equipment, use the equipment, and return the equipment to the space where it is stored. In other words, the issues of retrieving and returning are marginalized in the research.

While some objects have characteristics that allow one to easily predict their location, there are others that are more difficult to find because their locations are more fluid, ever changing, and dependent on several different variables. For these objects, there are multiple places where the object could be. Frequently a nurse must search in more than one place because a caregiving activity requires more than one object or the object that she is searching for is not found in the first place that she looks. Furthermore, it is not uncommon for a nurse to have to go to another unit in the hospital to borrow the object that she is looking for. Typically supplies are likely to be stored in one to three nursing support rooms, but the equipment may be found anywhere on the unit including the corridors, any of the nursing support rooms, or in one of many patient rooms. This means that a nurse must rely on remembering several cognitive maps for the multiple parts of her searching venture.

The searching activity with both the cognitive and embodiment components illustrates the connection

between the mind and the body in order to 'get the work done.' The cognitive maps include the unit wing that a nurse is assigned to that shift, the other wings on the surgical unit, the entire surgical unit itself, and the other units in the hospital. The cognitive maps differs from the one that the floor plan implies and so a nurse is required to remember not just one cognitive map but multiple cognitive maps of her workspace. Some of the edges of these "maps" are not delineated with fixed features but rather, they are designated with semi-fixed features such as medication carts and linen/supply carts. Other times, the edges of an area are even more ambiguous and remain in the nurse's cognitive understanding of the space. Consequently, the boundaries between the areas can be blurred or fluid in nature.

The nature of *moving activities* as they relate to nursing work and 'getting the work done' is that the nurses are constantly moving patients and objects. There is often a heavy workload on the surgical unit. The nursing assignments factor in the physical capabilities of the nursing staff. The nurses work within several different types of time frameworks, schedules, and a certain unpredictability that is common to surgical units. For the most part, the nurses feel that they are racing against time and that they are always trying to 'get the work done' without falling too far behind.

A large part of the moving activities that the nurses do is moving objects from one place to another. This includes the carrying of objects on their persons, and moving in a crowded and cluttered workspace as they squeeze among the many semi-fixed objects in their space. The nurses do as many as nine within-unit transfers per day in which a small group of nurses will move a patient and his or her entire set of objects (furniture, bed, patient belongings) from one room to another. Most of the nurses in this study stated that the most physically laborious activities that they did were these within-unit transfers.

Because the storage space on the surgical unit is inadequate to accommodate all the necessary semi-fixed objects, the nurses are frequently re-arranging objects and moving objects from one place to another. Because the space in the patient rooms barely accommodates the basic patient furniture leaving little room on either side of the bed or between the foot of the bed and the wall, the nurses often find themselves squeezing in-between semi-fixed and fixed features in their workspace. The findings of this study indicate that the nurses need enough space in the corridors and the nursing utility rooms to accommodate a dynamic landscape of objects. Also, there are many different types of objects in the nurses' workspace that are difficult to move and therefore, create potential for injury.

The nature of *recovering activities* were found to be influenced by a nurse's perspective about surveillance, self-surveillance, entitlement, and accessibility which contributed to her decision about when and where she will take her break, and whether she can take her entire break. A nurse's experience of the space as private or public, back stage or front stage will also contribute to a

nurse's decision about her break. The main nursing station and the patient lounge were found to be two spaces on the surgical unit that have fluid characteristics because the spaces are experienced differently on the night shift versus the day shift. Also, there were nurses who felt differently about whether the space is public or private and whether they are entitled to be in that space or not, regardless of the shift. Hence, a nurses' spatial experience is shaped by her sense of embodied professionalism.

4. THINKING BEYOND HIERARCHIES AND DICHOTOMIES

To be inclusive of the workspace issues that are significant to staff nurses, it is important that hospital staff nurses and nursing researchers are an active part of a multi-disciplinary approach towards the design research of nursing workspaces. This research study addresses a longstanding problem in healthcare design research, which is that staff nurses and their experiences of the workspace are marginalized in the literature and in healthcare design research. Researchers and designers would benefit from finding out from the nurses directly what to measure and what their design needs are. The valuable insights that staff nurses can bring to a successful workplace design are long overdue. The extensive knowledge base and lived work experience that a staff nurse possesses as a *user* of the hospital setting has often been neglected in the process of designing healthcare facilities for patients. As confirmed by this study, there is a strong relationship between nursing work, the objects in their workspace and the design features of the hospital unit. This research has demonstrated that an *embodied professionalism* that 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. Researchers need to be aware of the insidious hierarchies that are embedded in academia. Whose point of view is dominating the discourse? Whose yardsticks are being used to measure nursing actions? As this study progressed it became obvious that there are two distinct perspectives and different actors apply different meanings and significance to terms and words that come out of the design research domain. The nursing actions that can result in efficiency and productivity are termed different and experienced differently by staff nurses.

Healthcare design researchers in the fields of architectural and environment behavior design need to educate themselves about the nursing profession. This is recommended in order to augment a knowledge base that is deficient in understanding the way in which hospital nurses work, their nursing credentials, and nursing professionalism. More studies should be done at the scale of the everyday experience of the laboring body of the nurse.

This study has demonstrated how a study of space is inseparable from human activity and the experience of that space. An analysis of space needs to be inclusive of the body and time dimensions of these spaces as well as the nature of the nursing work itself and the activities and behaviors that occur in these spaces. Healthcare design researchers do not so much need more studies on user preferences but rather, new studies on how the space is used and experienced. Importance should be given to nursing activities and in particular, the hidden activities which are not measured or even included in such inventories as work sampling. A study of the activities can illustrate the differences between the different types of hospital units and the differences between medical conditions of the patients and what they require in terms of supplies and equipment.

This research presents a new way of conceptualizing the person-environment relationship that goes beyond measuring the impact of design on the productivity and efficiency of the nursing staff. The utilization of these qualitative research methods can lead to greater insights about how nurses experience their workspace which can then serve as generators for other studies that are both quantitative and qualitative in nature. The conceptualization has salient theoretical and research utilization significance that is transferable to studying other types of nursing units, other socio-spatial experiences such as privacy and territoriality, the study of institutions and workspaces, and to other occupations such as office workers. This study also contributes to future research on the nurse-patient relationship, the efficacy of nursing care, employee sick time and injuries, comparisons of male and female nurses, and working conditions in the hospital setting.

REFERENCES

Esser, A.H., Chamberlain, A.S., Chapple, E.D., & Kline, N.S. 1967. *Territoriality of patients in a research ward*. In W.H. Ittelson, H.M. Proshansky, & L.G. Rivlin (Eds.), *Environmental psychology: Man and his physical setting* (pp. 208-214). New York: Holt, Rinehart & Winston.

Field, H.H. Hanson, J.A., Karalis, C.J., Kennedy, D.A., Lippert, S., & Ronco, P.G. 1971. *Evaluation of hospital design: a holistic approach*. Boston, MA: Tufts-New England Medical Center.

Fisher, J. 1990. *Foreword*. In W. Charney and J. Schirmer (Eds.) *Essentials of Modern Hospital Safety*. Volume 1. Chelsea, Michigan: Lewis Publishers.

Hamilton, K. 2003. *The Four Levels of Evidence-Based Practice*. *Healthcare Design*, 3, 18-26.

Ittelson, W.H., Rivlin, L.G. & Proshansky, H.M. 1967. *The use of behavioral maps in Environmental psychology*. In W.H. Ittelson, H.M. Proshansky, & L.G. Rivlin (Eds.), *Environmental psychology: Man and his*

physical setting (pp. 658-668). New York: Holt, Rinehart & Winston.

Keddy, K. 2006. *Embodied Professionalism: The relationship between the physical nature of nursing work and nursing space*. PhD dissertation. University of Wisconsin-Milwaukee.

Kennedy, P., Fisher, S., & Pearson, E. 1988. *Ecological evaluation of a rehabilitation environment for spinal cord injured people. Behavioral mapping and feedback*. *British Journal of Clinical Psychology*, 27, 239-246.

Leland, N. & Lee Williams, V. 1994. *Creative Collage Techniques*. Cincinnati: North Light Books.

Meyrowitz, J. 1985. *No Sense of Place. The Impact of Electronic Media on Social Behavior*. New York: Oxford University Press.

Sommer, B. & Sommer, R. 1997. *A Practical Guide to Behavioral Research. Tools and Techniques*. Fourth Edition. New York: Oxford University Press.

Trites, D.K., Galbraith, F.D., Sturdavant, M., & Leckwart, J.F. 1970. *Influence of Nursing Unit Design on the Activities and Subjective Feelings of Nursing Personnel. Environment and Behavior*. *An Interdisciplinary Journal*, 303-325.

Ulrich, R.S. 2003. *Creating a healing environment with evidence-based design*. Paper presented at the American Institute of Architects Academy of Architecture for Health Virtual seminar – Healing Environments. October 10.

Weiss, S.M., Malone, R.E., Merighi, J.R., & Benner, P. 2002. *Economism, Efficiency, and the Moral Ecology of Good Nursing Practice*. *Canadian Journal of Nursing Research*, 34 (2), 95-119.

Williams, B., 2002. *Using collage art work as a common medium for communication in interprofessional workshops*. *Journal of Interprofessional Care*, 16, 1, 53-58.

ZMET. (2002). Division of Research. The Mind of the Market Laboratory. <http://www.hbs.edu/mml/zmet.html> (accessed September, 2002).