THE ROLE OF PHYSICAL DESIGN AND INFORMAL COMMUNICATION AND

LEARNING IN GAINING COMPETENCY AND REDUCING STRESS AMONG

GRADUATE NURSES

A Thesis

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ABSTRACT

High turnover is a prime cause of today's nursing shortage, and is often the result of job dissatisfaction and burnout. At particular risk are Graduate Nurses (GN), who struggle to feel competent as they transition from the academic environment to the hospital environment.

Using an exploratory case-study research design utilizing a multi-method approach, this study explored the relationships between the design and layout of the physical environment, GN interaction patterns, opportunities for informal learning and support, stress, and the gaining of necessary competencies. The five data collection methods used were shadowing the GN using the Clinical Work Measurement Tool, a registered nurse and GN survey, GN blood pressure measurements, GN weekly competency ratings, and focused interviews.

Results showed a correlation between increasing competency ratings and decreasing blood pressure. The results also demonstrated the importance of "backstage" areas such as break rooms and med rooms for informal learning, social support and the unit's cohesion. The GN interacted infrequently with doctors in any area, however, which supports previous research on the work patterns of nurses.

This research suggests that formal approaches to GN Orientation, which focus on the effective one-on-one interaction with a designated mentor, can and would benefit by insuring a supportive unit culture and purposeful design interventions that increased the likelihood of more interaction across disciplinary boundaries. Future research should explore in greater depth the role played by backstage (vs. frontstage) areas in facilitating informal learning and social support among both GNs and caregivers generally, and the effect of these opportunistic interactions on multi-disciplinary teamwork.

BIOGRAPHICAL SKETCH

Rosalie Gail Adams was born in Auckland, New Zealand and received her Bachelors of Arts in Biology, with a Minor in Studio Arts, from the University of Rochester in 2006. She studied abroad in London, UK, and worked as a marketing intern at BBC Worldwide. After returning to Rochester, New York she worked for Rochester Regional Community Design Center on marketing and event planning projects. In the fall of 2006 she attended Cornell University to pursue her Masters of Science in Facilities Planning and Management in the Department of Design and Environmental Analysis, with a concentration in Healthcare Administration. Her research interests included the influence of nursing unit design on staff communication and sustainable design. After completion of her degree she will intern abroad with Lyons Architecture in Brisbane, Australia on the design of a new pediatric hospital. Following the internship, she hopes to pursue a career in healthcare facilities planning and design, with a focus on pediatric and wellness facilities.

ACKNOWLEDGMENTS

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CHAPTER 1

INTRODUCTION

1.1 Opportunity for Change

The current healthcare environment necessitates change as the "chasm" between patient needs and quality of care continues to widen (Institute of Medicine, 2001). Healthcare facilities are overwhelmed by exorbitant costs of care, unsafe environments, inefficient operations, rapidly advancing medical and information technology, increasingly chronic patient conditions, and severe labor shortages (Cama, 2006). However, the current condition provides a unique opportunity to bring about positive change. While improving the quality of care will require assessment and evolution of the entire interdependent healthcare system, one point of entry is exploring the relationship between the physical design and the quality of care (Becker, 2007). Taking advantage of this opportunity is the rapidly-growing trend in evidence-based design, where design decisions are guided by "sound design principles, designer knowledge, client input, but most importantly on scientifically sound research (Pangrazio, 2007)." Results from such research are gaining attention by demonstrating a positive correlation between evidence-based design and improved quality of care (Ulrich et al., 2004; Cama, 2006; Joseph, 2006). The time has never been better to practice evidence-based design. Hospital construction is booming nationwide, with over $38 billion spent on new construction in 2006, and this trend is expected to continue for several years in all healthcare sectors (Romano, 2007). Given that these facilities will last for 20-50 years, this wave of new construction provides a unique opportunity to influence how these healthcare facilities deliver care now and into the future.

1.2 Nursing Shortage

      The Joint Commission Public Policy Initiative has identified the increasing

nursing shortage as an issue with the potential to "seriously undermine the provision

of safe, high-quality health care and, indeed, the health of the American people (2002).

According to the Joint Commission (2002), 126,000 nursing positions are currently

unfilled around the country, and the public are increasingly aware and concerned. The

average age of a registered nurse is 43 (Joint Commission, 2002) and, as more nurses

reach the age of retirement, too few new nurses are entering the field. This shortage is

occurring at a time when patient demands are increasing, chronic conditions abound,

and hospitals are trying to prepare for the forecasted wave of 78 million aging baby

boomers.

1.2.1 Nursing Stress, Job Satisfaction and Quality of Care

      A primary reason for the current nursing shortage is the high level of job

turnover within the nursing profession. Extensive research on nursing turnover

supports a causal relationship between job dissatisfaction, burnout and intent to leave

(Joint Commission, 2002; Aiken et al, 2001; Cowin, 2002). In a recent US study, 41

percent of current nurses reported being dissatisfied with their jobs, and an American

Nurses Association survey found that 55 percent of nurses would not recommend their

profession (Joint Commission, 2002). The results of a 2001 nationwide survey of

4,826 nurses revealed that over 70% of the respondents reported stress as one of their

top three concerns (Houle, 2001 in Pati et al., 2008). An Australian study (Healy &

McKay, 2000) of 129 Registered Nurses found a significant negative correlation

between nursing stress and job satisfaction. The reasons for job dissatisfaction and

stress are well documented and include insufficient pay, lack of professional status,

feelings of powerlessness, excessive workload, inadequate staffing, and ineffective

communication (Joint Commission, 2002; Buerhaus et al, 2002; Kovner et al, 2006; Taylor et al, 1999; Cowin, 2002). A study of 760 Australian nurses (Winwood & Lushington, 2006) found that the psychological strain experienced by nurses affects sleep quality and impairs recovery from work strain. According to Pati et al (2008) there is a growing body of evidence relating stress-induced fatigue to medical errors (Barach & Weinger, 2007; Page, 2004; Tabone, 2004), which creates serious concern for patient well-being.

1.3 Transition Experience of Graduate Nurses

High stress levels are of particular concern for graduate nurses (GN), who struggle with the transition from the school environment to the hospital environment (Kramer, 1974; Kelly, 1998; Casey et al, 2004). The transition process of becoming a highly skilled nurse has been explored in detail by Dr. Patricia Benner (1984), who has identified five stages of proficiency: novice, advanced beginner, competent, proficient and expert. To progress through these stages the GN must transition from detached observer to involved performer, moving from a reliance on rules and abstract principles to the use of past concrete experiences as paradigms. The expert nurse must develop a highly skilled analytic ability, and learn how to view a situation as a complete whole in which the parts have varying degrees of relevance. The difficulty of transitioning from novice to expert has been well documented and, as Fisher and Connelly (1989) identified, the first three to six months of a nurse's career is one of the most stressful times that they will experience. One reason cited for the high stress levels in these GN is an impending feeling that they have not learned enough to function independently on a hospital ward. As one study found, "Graduate nurses do not feel skilled, comfortable, and confident for as long as 1 year after being hired (Casey et al, 2004). In fact, the current nursing shortage is exacerbated by a shortage

of appropriately skilled nurses who have the expertise to respond to a rapidly evolving healthcare environment (Joint Commission, 2002; Peterson, 2001). Stress from feelings of incompetence, and stress-related illnesses can lead to quick turnover rates of new nurses. A national survey distributed by the National Council of State Boards of Nursing (Kenward & Zhong, 2006) to Registered Nurses who had been working an average of 7 months found that 33% of the new nurses had changed their nursing position or planned on leaving their current position within the next year.

1.3.1 Formal Learning Strategies

Various formal learning strategies have been implemented in an effort to assist in this transition from student to qualified professional, such as mentoring, shadowing, and formal orientation programs, which can last anywhere from 3-12 months. Research has shown that pairing a GN with a preceptor results in a dynamic, interactive relationship, and that the more effectively a preceptor provides guidance, the more effectively the GN understands the complex unit culture and gains competency in providing complex patient care (Godinez et al, 1999; Casey et al., 2004). However, these orientation periods can be costly, with estimates ranging from $18,000 for an 8 week orientation period to $25,000 for a 12 week period (Maiocco, 2003). With a pending nursing shortage, the time and energy required by senior nursing personnel to implement these methods may not always be a viable option (Maiocco, 2003).

1.3.2 Negotiating Identity

Not only are formal learning strategies costly, they do not address the entire picture, often because preceptors are not trained correctly (Maiocco, 2003; Casey et al, 2004). The transition experience has been shown to be a complex psycho-social

process as the GN struggles with role transformation and sense of belonging (Casey et al., 2004). Yet, as Kelly (1998) notes, "an assumption made by new graduates is that they are entering a culture that they know and understand. This misconception is one of the first disillusionments they experience." Kramer (1974) describes this experience as a "reality shock," as the GN attempts to reconcile their real-world experience with the moral ideals they developed in nursing school. The GN inability to provide optimum patient care can result in self-criticism and self-blame, as they struggle to live up to their own and others expectations (Kelly, 1998). Therefore, a sense of moral distress over their own incompetency contributes significantly to the extreme stress experienced by GN, as they attempt to negotiate their identity within the new hospital culture.

1.4 Communities of Practice, Informal Communication and Learning

The experience of a GN transitioning into the working world can be understood using the theoretical framework of Communities of Practice (Lave & Wenger, 1991). Communities of Practice (CoP) are an integral part of our daily lives and evolve over time as people "develop a common practice…shared ways of doing things and relating to one another that allows them to achieve their joint purpose (Wenger, 1996)." In a hospital environment, a nursing unit team can be viewed as a CoP, where a wide range of people share a common purpose. The community has a unique history, identity, and way of doing work. According to Wenger (1998), the process of transitioning into a new community is one of the most "significant challenges faced by learners." A new community member sits at the periphery of the CoP until accepted by the "old-timers" of the community. Once the new member's legitimacy has been acknowledged, the new member must negotiate their identity

within the context of their new community. This transformation of identity is in fact what learning is all about.

Unfortunately, many institutions hold a common assumption that learning is primarily an individual process where collaborating is seen as cheating and training occurs distraction-free and out of context (Wenger, 1996). In contrast, Lave & Wenger (1991) propose that learning is "fundamentally experiential and social," and occurs through participation rather than passive acquisition. The process of dynamic interaction with "old-timers" allow the new member to gain competency by learning not only technical skills, but also the "tricks" of their trade, understanding the organizational culture, and knowing how to get good information (Becker, 2007).

Central to the CoP framework is the concept of knowledge sharing through opportunistic encounters (Becker, 2007), such as the unplanned interactions that can happen while merely passing someone in a corridor. According to Zahn (1991), face-to-face informal communication interactions are particularly important for both the exchange of task information, but also "emotional information and social support." The literature on the GN transition shows that social support and a sense of belonging assist the GN in becoming part of the clinical team (Casey et al., 2004). However, the focus of such research has been on formal orientation and the preceptor relationship. There is no research on the potential role played by opportunistic communication and informal, social learning to aid the GN in accessing knowledge networks and becoming an effective team member.

Lave & Wenger's (1991) participatory theory of learning does not discredit more formal approaches, such as mentoring. Rather, it acknowledges the value of informal, participatory learning as a means of sharing knowledge and transitioning from knowing in theory to knowing in practice.

1.5 Hospitals as Communities of Practice

While the CoP framework has been used in the corporate world to understand the learning process of new hires (Becker, 2007; Lesser & Prusak, 2000; Brown & Duguid, 1991; Chao & Yin, 2003), the framework has rarely been applied to the field of healthcare. And yet, functioning as learning environments is a business imperative for hospitals (Wegner, 1996), to facilitate a give and take of information between both new members and "old-timers." Only as learning environments can hospitals evolve to meet the complex, rapidly changing healthcare needs of patients. The appropriateness of the CoP framework to healthcare is demonstrated not only by the imperative of learning, but also by understanding the nature of communication within healthcare.

1.5.1 The Importance of Communication and Teamwork in Hospitals

Studies on the nature of communication among clinical staff show that opportunistic conversations are common in the hospital setting (Becker, 2007), and that staff prefer to turn to each other for information and decision support (Coiera & Tombs, 1998; Parker & Coiera, 2000). An Australian study (Coiera et al, 2002), which observed the communication patterns of 6 nurses and 6 doctors, showed that 82% of all communication was through face-to-face conversation. Safran et al. (1999), reviewing the flow of information in a hospital with an established computer-based record system, found that about 50% of information transactions still occurred face-to-face. These studies indicate that the greatest source of knowledge lies within the interconnected web of conversations between hospital staff (Coiera, 2000).

The vast majority of hospital mishaps result from inadequate communication among healthcare staff (Kohn et al, 1999; Coiera, 2000; Patient Safety and Clinical Quality Program, 2005). Therefore, it is crucial to take advantage of the rich

knowledge networks that exist within hospitals. This can be achieved by fostering

effective teamwork through high levels of participation, commitment to quality, and

support for innovation (Borrill et al, 2001). Joseph (2006) quotes a study in a cardiac

surgery program in Concord, New Hampshire that shows how multidisciplinary

rounds have become a way to reorient the care team to a collaborative culture of

interaction (McCarthy and Blumenthal, 2006). The benefits of teamwork lie not only

in improving delivery of complex care (Mickan & Rodger, 2000), but have also been

shown to improve nurse's job satisfaction, reduce stress, and reduce intent to leave

(Rafferty et al., 2001).

Healthcare environments are sites of frequent opportunistic communication,

and necessitate effective care teams that foster participation, innovation and learning.

Given this characterization of hospitals, the CoP framework is an appropriate tool for

analyzing and making sense of the hospital environment, and exploring how GN can

become effective members of healthcare teams.

1.6 Organizational Ecology and Physical Design

Hospitals are chaotic, complex systems, with myriad behaviors and

unpredictable circumstances colliding at a rapid rate (Bromberg, 2006). Traditionally,

improving the delivery of care within this chaotic environment has been treated as an

organizational and management issue (Pati et al., 2008). However, according to the

concept of Organizational Ecology (Becker, 2007), all organizations are characterized

by the interdependence of organizational, social and *physical* [italicized by the author]

systems, such that the physical elements both shape and are shaped by the

organizational and social systems. Physical elements can support or inhibit activities

and behaviors, such as stimulating positive social interactions, or inhibiting

impromptu communication. Such physical elements are defined by Gibson (1977) as "affordances," and by Becker (1980) as "behavior catalysts."

While the concept of Organizational Ecology has been demonstrated extensively in the corporate setting for more than 20 years (Becker, 2006), its applicability to the healthcare setting is just being recognized (Joseph, 2006). The current movement of Evidence-Based healthcare design provides an entry point into understanding and improving the complex healthcare system, by seeking to understand the relationship between physical design and delivery of care. At a time when healthcare construction is booming in the US, it is imperative to understand the impact of design decisions.

1.7 Healthcare Design and Delivery of Care

According to an extensive literature review by Ulrich & Zimring (2004), there is a growing body of scientific research to guide Evidence-Based healthcare design. The current literature focuses on how the physical environment can improve patient safety, reduce patient stress and improve outcomes, improve overall healthcare quality, and reduce staff stress and fatigue and increase effectiveness in delivering care. Within the patient-centered literature, landmark studies were conducted by Ulrich (1984, 1991, 1999) on the role of positive distractions, such as views of nature, in reducing stress. In his study entitled "View Through a Window May Influence Recovery from Surgery (1984)," Ulrich found that 23 surgical patients assigned to rooms with views of nature has shorter postoperative stays, received fewer negative status evaluations, and required fewer painkillers than 23 matched patients in similar rooms with views of a brick wall. Additional design characteristics have been shown to provide a safer, more healing environment for patients, such as reduced noise,

single-room versus multi-bed rooms, improved lighting, better ventilation, and more ergonomic designs (Ulrich et al., 2004).

While research has focused primarily on the impact of the physical layout on patient outcomes, there are several studies that document a) effects of healthcare environments on staff health and safety and b) improving workplaces to increase staff effectiveness, reduce errors, and increase staff satisfaction (Ulrich et al., 2004; Joseph, 2006). The time spent walking by nurses, and its affect on fatigue and quality of care, has received a lot of attention in the literature (Ulrich et al., 2004; Joseph, 2006). Nurses spend nearly one third of their time walking on the unit between patient rooms, supply closets and the nurses' station (Burgio et al., 1990). Both Ulrich et al. (2004) and Joseph (2006) quote a study by Shepley & Davies (2003) that found the type of unit layout (i.e. radial, single corridor, double corridor) influences the amount of time spent walking. Furthermore, the time saved in walking was translated into more time spent on patient-care activities and interaction with family members. A recent study by Pati et al (2008) explored the relationship between exterior views and nurse stress. The study found that view duration influences alertness and acute stress, and is conditional on the view content (nature vs. non-nature view). Furthermore, the study concluded that access to natural views and light could directly affect a nurse's ability to provide optimum patient care.

While there is a growing body of staff-centered research, the literature reviews by Ulrich et al (2004) and Joseph (2006) demonstrate a limited understanding of how the physical design can facilitate opportunities for clinical staff to interact with each other for effective communication and knowledge sharing. This gap exists despite unanimous agreement on the importance of effective communication and teamwork in improving patient care.

1.8 Trends in Nursing Station Design

The nursing station is a critical junction of activity on the inpatient hospital floor, where virtually every hospital function intersects via impromptu meetings between hospital staff (Bromberg, 2006). Therefore, as a hub for informal communication the nursing station provides an ideal physical setting for exploring the relationship between design, communication and knowledge sharing.

Such research is needed now more than ever, as new hospitals continue to rise with little guidance on how to design an effective nursing station. A debate currently exists within the healthcare design world over decentralized versus centralized nursing station design (Flynn & Barista, 2005; Bromberg, 2006; Gurascio-Howard & Malloch, 2007). Through ethnographic research of nursing stations, Bromberg (2006) and other members of the Nurture by Steelcase research team observed the following patterns. A decentralized design has no central hub and nursing stations are located outside each patient room. While nurses were closer to patients and less prone to distraction, they had fewer opportunities for informal learning, were further from the unit receptionist, and often experienced feelings of isolation. A centralized design has a centralized nursing station hub. While nurses were able to work together and have quick access to each other for learning and communicating, they were further from patients and experienced greater congestion and noise. According to Flynn & Barista (2005), another nursing unit typology is the hybrid design, which combines a central, collaborative space with small, decentralized nursing units closer to patients, where the central hub functions as an "information center."

A recent study by Gurascio-Howard and Malloch (2007) provides the first quantitative evidence for Bromberg's observations. The purpose of their study was to examine centralized and decentralized medical-surgical nurse station design in relationship to direct care time, communication types, time in indirect clinical

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activities, and patient satisfaction data. The results of the study suggest that a

centralized design increases the opportunity for Registered Nurses (RN) to network,

mentor and communicate with Unit Coordinators. For example, one RN stated that if

a colleague was observed as experiencing a high work demand, other would

instinctively assist. On the other hand, the decentralized design allowed closer

proximity to patients, computers, and line of sight to patient-room call lights; and

patient perception of response time was more favorable. An unpublished Master's

Thesis by Dutta (2008) also supports these findings. In a pre-post study, Dutta (2008)

assessed the influence of relocating an ICCU from a centralized to a more

decentralized nursing station on opportunistic communication and interaction patterns

among clinical staff. The results showed that the frequency of communication

decreased when the staff moved from the centralized to the decentralized nursing

station. Furthermore, once established in the decentralized nursing station, clinical

staff tended to congregate around one specific area, in effect creating an interaction

hub even when one had not been designated.

1.8.1 Nursing Station Design, Informal Communication and Learning

While the debate over nursing station typology continues, research has linked a

few general design concepts to the facilitation of opportunistic communication and

informal learning among clinical staff. These design concepts are physical and visual

proximity (Becker, 2007; Kalisch & Begeny, 2005; Flynn & Barista, 2005; Whittaker,

1994), the creation of different activity zones (Bromberg, 2006; Sundstrom & Altman,

1989; Becker, 2007; Iedema, 2005), and alternative workplace strategies (Gileard &

Tarcisius, 2003).

The importance of physical and visual proximity was originally established in

the corporate environment. In his article on organizational ecology and the workplace,

Becker (2006) discusses the design concept of "spatial transparency," which provides greater opportunity for employees to easily see and hear what others are doing as they move about their workspace, and more opportunities for modeling behavior, sharing information, developing trust, and willingness to give critical feedback in early stages of idea development. This concept is echoed by Whittaker et al (1994), who observed the behavior of office workers by shadowing their activities and conversations. Whittaker et al (1994) found that workers who are physically collocated are more likely to communicate frequently and informally. The importance of spatial transparency in nursing stations is illustrated by a study described by Flynn & Barista (2005) at the Sutter Roseville Medical Center in Roseville, California. The horseshoe shaped decentralized stations in the medical-surgical and oncology units lacked visibility and proximity and left the nurses feeling isolated and unable to effectively support each other. The clinical manager reported that the stations were so isolating that staff wouldn't even know if everyone had shown up for a shift. Kalisch & Begeny (2005) also support this finding, commenting on the loss of "synergistic cooperation" due to physical distance between clinical staff.

In order for spatial transparency to work effectively, it must be combined with the creation of activity zones. As Sundstrom & Altman (1989) suggest, the most effective workplace environments are those in which personal and group boundaries can be clearly established while visibility to adjoining spaces is maintained. In the healthcare environment, Bromberg (2006) discusses the importance of removing barrier walls and creating distinct zones within centralized nursing stations. The first zone is "curbside," where impromptu meetings take place. The second zone is "Step-in," for more involved work such as charting. The third zone is "Immersive," which allows for concentration and privacy for planned meetings. By establishing these

three zones within a barrier-free setting the potential for a smooth work flow and staff communication is enhanced.

A study by Iedema et al (2005) explores another type of zone, what Becker (2007) has called the "neutral zone." These are areas that are not "owned" by any disciplinary group (i.e., formally assigned for exclusive use by one person or group, such as occurs with a personal office or a lounge accessible only by doctors). In such neutral zones the social status distinctions associated with the usual professional hierarchical boundaries (e.g., doctors and nurses) are suspended. These neutral zones exist in hospital corridors, providing a space where diverse clinical staff (e.g., doctors, nurses, and allied health professionals) interact opportunistically (without prior scheduling of meetings), and where the expression of uncertainty and questioning about both diagnosis and treatment plans is tolerated and even welcomed. Unlike formal and scheduled communication events, such as unit rounds, the informal and opportunistic communication that occurs in corridors allows information to move freely across hierarchical levels, such that an occupational therapist may question a doctor, or a doctor may ask a nurse for advice. Not only do neutral zones support opportunistic communication, they also promote learning by providing a safe environment for expressing ignorance.

Alternative Workplace Strategies (AWS) is a concept that also originated in the corporate environment and, similar to neutral zones, refers to non-territorial work environments where physical space no longer delineates authority or ownership. In addition, AWS creates spaces where workers from different departments and specialties are co-located. This concept was applied at Pamela Youde Nethersol Eastern Hospital in Hong Kong, where they redesigned the Comprehensive Pediatric Rehabilitation Center (Gilleard & Tarcisius, 2003). The redesign illustrated the potential of a clinical unit's physical design to facilitate multi-disciplinary teamwork

and foster a shared vision among clinical staff. The original design physically isolated the different health professionals (such as doctor, physical therapist, pharmacist, clinical psychologist), separating them by floor and by long corridors. As a result, physical space delineated authority and ownership and each discipline operated independently, encouraging a silo mentality. By contrast, the new unit was composed of one large open plan area and four smaller workspaces, where a variety of health professionals worked together. By incorporating AWS, the Rehabilitation Center was able to significantly improve communication patterns, resolve conflict and increase cooperation across disciplines, and achieve higher levels of service quality according to patient and family feedback.

Thus, while limited, research in the hospital setting suggests that there is a relationship between the physical design of nursing stations and informal communication and learning. However, there is no research that explores this relationship from the perspective of a GN transitioning into the working world. Given the serious nursing shortage faced by US hospitals, high nurse stress, and the extremely high turnover rates of GN, this thesis seeks to explore the role of physical design and informal communication on gaining competency and reducing stress among Graduate Nurses.

1.9 Research Questions and Hypothesis

Given the limited prior research on this topic, only one hypothesis was developed, along with three specific research questions. This thesis was exploratory in nature and sought to understand the patterns of communication and interaction of a GN, and the physical locations of these patterns. Furthermore, it examined whether or not there was a relationship between the GN communication and interaction patterns,

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the gaining of competency, and the reduction of stress. The three research questions and hypothesis were:

1. What are the patterns of communication and interaction of the GN, such as who they speak with, where do the conversations occur, and what is it about; and do these patterns change over time during the course of the orientation?
2. Do certain design features of the nursing unit's physical layout encourage and facilitate informal learning for the GN? Do certain design features inhibit informal learning?
3. Given the GN patterns of communication and interaction, and opportunities for informal learning, is there a relationship with the GN competency levels over the course of the orientation?

Hypothesis: As the GN competency levels increase over time, stress levels will decrease.

CHAPTER 2

METHODOLOGY

2.1 Research Design

This study used an ethnographic approach to explore the patterns of communication and interaction of a Graduate Nurse (GN), and where they occurred on a nursing unit at Crouse Hospital in Syracuse, New York; and whether these patterns related to gaining of competency and stress levels during the 12-week formal orientation period. A multi-method approach was used, collecting both qualitative and quantitative data on GN interaction patterns, informal on-the-job learning, stress levels, and competency.

2.2 Site Selection

The Hospital

Crouse Hospital was selected because of the genuine interest of the Hospital administrators and nursing unit managers to participate in academic research. Due to the intensive nature of a 3-month ethnographic research design, the study would not have been possible without the interest and support from both the administrative and clinical staff of Crouse Hospital.

The Nursing Unit

The nursing unit at Crouse Hospital was selected for the study site because of the typical centralized layout of the Unit (see figure 1), and because a GN was beginning orientation on this unit when the study began.
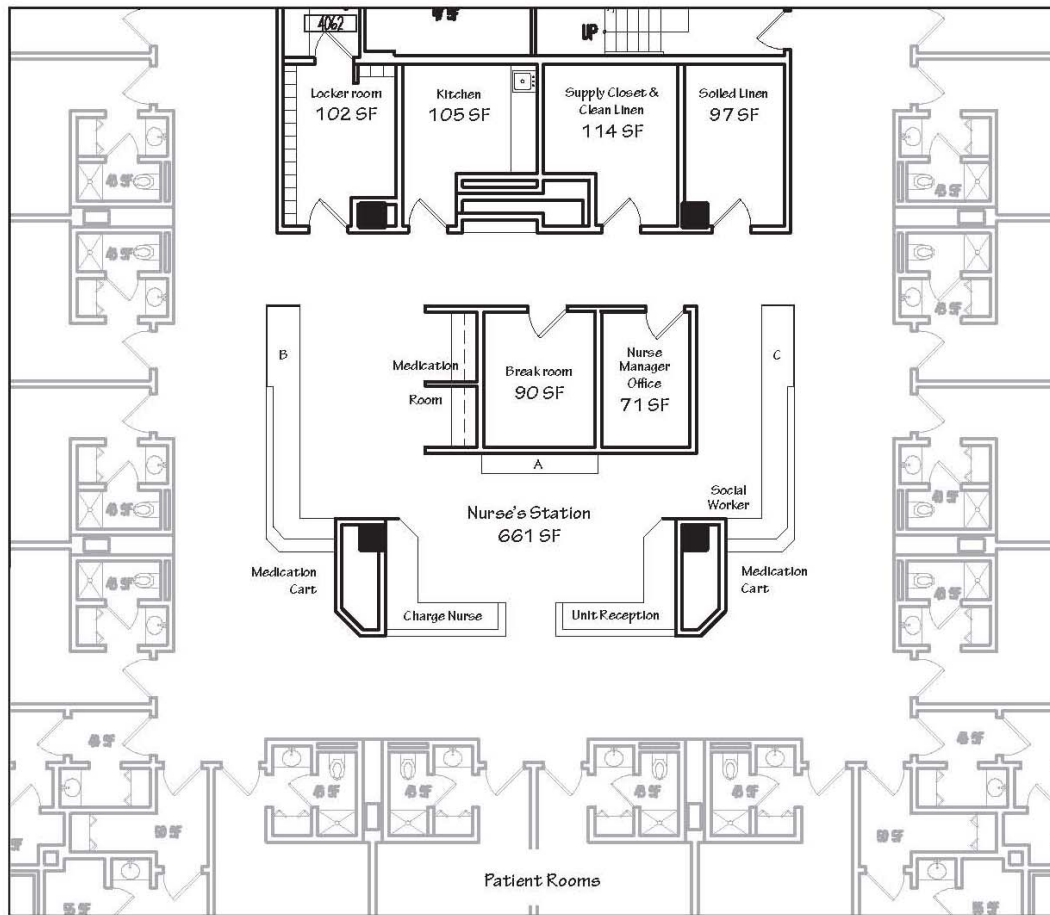
Figure 1 Nursing unit floor plan

2.3 Site Description

The Hospital

Crouse Hospital is a 501 c-3 not-for-profit organization and serves a 15-county area of Central New York. Crouse operates 576 acute-care beds, providing both inpatient and outpatient services, and is accredited by the Joint Commission on the Accreditation of Healthcare Organizations. The Hospital also operates the Crouse Hospital School of Nursing, which is located on site and provides nursing students the opportunity to train and work on Crouse Hospital nursing units.

The Nursing Unit

The nursing unit is a 661 SF adult medical oncology/gynecology/surgical unit, with 30 218 SF double rooms, and 4 119 SF single rooms. The Unit has a high patient acuity level of 9.1, which is determined by the measure 'Hours Per Patient Day (HPPD), and uses a 10-point scale where 10 equals the highest level of patient acuity. HPPD is used to determine the number of staff members needed on any given hospital unit to assure adequate coverage and patient care. The staffing matrix for the Unit recommends a 4:1 patient to registered nurse ratio for the daytime shift. The Unit consists primarily of double-bed rooms, with two single-bed rooms for patients requiring isolation. Services provided include diagnostics, pain management, chemotherapy, surgical services, implanted radium therapy, nutritional intervention, homecare needs assessment, patient and family education and information systems, and "I Can Cope" educational services. These services are provided by a multidisciplinary care team consisting of a clinical nurse specialist, nurse manager, nurse practitioners, social workers, physicians, pharmacists, dieticians, and registered nurses.

2.4 Sample Size & Selection

The research design for the study was developed through discussions with Crouse Hospital administrators, nurse managers, and clinical nurse specialists involved in the GN orientation process. Based on the expected hiring pattern, the original intent for this study was to collect data on two different units in Crouse Hospital, and to follow approximately 3-4 GN per unit. However, at the time the study began only 1 GN was beginning orientation , and that person had chosen to work on a specific Unit. These circumstances dictated the sample size and selection. Despite the unexpected situation, the decision was made to continue with the study.

While there was only 1 GN to observe, the purpose of the study was to explore the GN interaction patterns with *all* staff on the unit. Therefore, the sample size was in effect the entire Unit, with a focus on the GN. Furthermore, this provided the opportunity to conduct an in-depth ethnographic study of the Unit *system*, leading to a more accurate understanding of the GN orientation experience.

The Unit sample consisted of a core group of regular staff who worked during the GN daytime shift on weekdays from 7am-3pm.

Regular Staff

- Registered Nurses (RN)   7
- Licensed Practical Nurses (LPN)   1
- Clinical Nursing Aides (CNA)   2
- Nurse Practitioner (NP)   3
- Social Worker   1
- Clinical Nurse Specialist   1
- Charge Nurse (CN)   1
- Unit Receptionist (UR)   1
- Nurse Manager (NM)   1

While the unit's staff census would stay approximately the same every day, the actual group of RN's, LPN's, and CNA's would consist of different individuals on different days, depending on the schedule of each individual. However, the other regular staff were always the same individuals.

Due to the co-morbid nature of the medical needs of the Unit's patients, there were frequent visits from other medical staff throughout the day. While it is difficult to provide an exact census for this group, the types of visiting medical staff were documented.

Visiting medical staff

- Physicians (Gynecology, Oncology, Medical)
- Therapists (physical)
- Dietician/Nutrition
- Float nurses
- Nursing students

The following non-medical staff were also part of the sample, when observed interacting with the GN.

Non medical staff

- Pharmacy
- Case manager
- Vendors
- Patient's family
- Housekeeping
- Maintenance
- Volunteers

2.5 Data Collection

Before data collection began, initial steps were taken to insure buy-in from Crouse Hospital administrative staff and the Unit nurse manager. This was achieved through two presentations describing the background and purpose of the study to the Director of Nursing, Director of Nursing Education from Crouse School of Nursing, two clinical nurse specialists involved with the Unit and the GN orientation process, the Unit nurse manager, and other registered nurses from the Unit who chose to attend. One-on-one meetings were also held with the nurse manager and clinical nurse

specialists to gain insight into the GN orientation process, how the Unit operated, and how to tailor the data collection methods to fit with the daily operations of the Unit. As part of the IRB approval, all Unit staff members had to be informed about the purpose of the study, the type of data to be collected and the methods for doing so. This was achieved by the researcher visiting the Unit and talking informally with staff, having the clinical nurse specialist and nurse manager talk to staff informally about the study, posting notices in the break room and the locker room that described the study, and emailing a brief study description to all staff working on the Unit (see Appendix A). Additionally, the study was explained in detail to both the GN and Orientor, and full consent was received to participate in the study (see Appendix B for staff consent & C for GN consent).

The first week of the 12-week orientation was spent in the classroom, and thus the GN was not on the Unit until week two, at which point data collection began. Data collection was intended to last for 11 weeks. However, the GN unexpectedly did not pass the National Council Licensure Examination for Registered Nurses, which ended the orientation after 8 weeks of data collection.

Both qualitative and quantitative data was collected, and included the use of five methods. The use of a multi-method approach (triangulation) stemmed from the premise that every data collection method has both strengths and weaknesses, depending on the type of data being captured. In this study, the range of outcome measures (interaction patterns, competency levels, and stress), as well as the subject's perception of factors that influenced these outcomes, required the use of very different methods. In combination the five approaches generated data that addressed the research questions identified at the end of Chapter One. The specific methods used were:

1. Clinical Work Measurement Tool

2. Biological measure of stress

3. Survey

4. Competency measure

5. Focused interviews

2.6 Clinical Work Measurement (CWM) Tool

The CWM tool, developed over a five year period by the Health Informatics Research & Evaluation Unit (HIREU) at The University of Sydney in Australia, employs multidimensional work classifications developed by those researchers for the purpose of measuring the work patterns of doctors, nurses and pharmacists. The method, which employs the use of a hand-held PDA equipped with specially developed software (see figure 2), allows researchers to shadow nurses, during which time continuous data is collected regarding the nurses type of behavior (e.g., charting, social interaction), as well as information about who is involved in the interaction. The CWM tool also enables measurement of changes in the time spent in specific interactions, and captures interruptions and multi or parallel tasking. Each interaction is programmed to be automatically time-stamped when selected by the observer. The tool has been field-tested by the HIREU, and showed inter-rater reliability scores of +85% (Westbrook et al., 2007).

For the purposes of this study the CWM tool categories were modified to more accurately reflect the research questions. The original version captured method of task execution, such as use of fax, telephone, computer etc. Because this study was interested in how the *physical design* influenced communication and interaction patterns, the task execution categories were replaced with physical location categories (e.g., corridor, nursing unit). To insure consistent data collection, each location

category referred to a specific region within the Unit (see figure 3). The behavior categories, which were originally task-based, were modified to focus on types of communication. The with-whom categories were also modified to reflect the staff on the Unit (see Appendix D for modified categories and definitions). The CWM modifications were the result of pilot research conducted from November 2007 – January 2008, at both Crouse Hospital and Cayuga Medical Center in Ithaca New York. During this time the communication and interaction patterns of GN with their Orientors and other staff were observed. These initial observations were discussed with both the Unit clinical nurse specialist and nurse manager, who later approved the modified categories. During this time, rules for using the "interrupt" and "multi-task" functions were also developed (see Appendix D). The pilot research period was also used to train the researcher in using the CWM tool, and how to accurately code the GN interaction and communication patterns.

The GN was shadowed weekly from January 15th until March 5th. Shadowing occurred 1-2 times per week (depending on the GN schedule and weather conditions for traveling to Crouse Hospital, in Syracuse, New York, 60 miles from Cornell University, in Ithaca, New York), for 3-5 hours each week between the hours of 7am – 3pm. Each shadowing session lasted between 1.5-2 hours (once again depending on the GN schedule, such as unpredictable break times) Overall, 1816 interactions were observed over 23 hours, during 19 sessions. In extensive studies by the HIREU, this duration of data collection has been found to result in accurate data recording (Westbrook et al., 2007)

Figure 2 PDA displaying CWM tool. Note: does not show modified categories

Figure 3 Nursing unit floor plan showing location regions for CWM data collection

2.7 Blood Pressure as a Biological Measure of Stress

Blood pressure (BP) was used as a biological measure of stress to document the GN stress levels over the course of orientation. According to the book *Measuring Stress,* edited by Cohen et al (1995), stress can be defined as the "Process in which environmental demands tax or exceed the adaptive capacity of an organism, resulting in psychological and biological changes that may place persons at risk for disease." In the chapter titled *Measurement of Cardiovascular Responses* by Krantz and Falconer

(1995), they explain how the cardiovascular system is highly responsive to physiological and psychological stress. BP measurement is a general, but very important, indicator of cardiac function and therefore an appropriate measure of the biological stress response, and has been used in scientific research for decades. For example, a study by Goldstein et al (1999) looked at the relationship between job demand and BP of female nurses and found a significant relationship between increased job demand and increased systolic BP. More recently, the HeartMath Research Institute has gained international recognition for their scientific research connecting stress, cardiac function, and well-being. In a HeartMath-funded study by McCraty et al (2003), where BP was used as a measure of work-place stress, they found a significant reduction in systolic BP for subjects who received a 3-month stress reducing intervention. In addition to being an appropriate measure, BP is also the most time-efficient, non-invasive measure of cardiac function, which are important considerations when doing research with busy nurses. For these reasons, BP was chosen for this study as the biological measure of stress.

The procedure for measuring GN BP was informed by *Measuring Stress* (Cohen et al., 1995). Because a single BP reading can be highly unreliable, the GN took two consecutive readings three times per day (a total of six readings) during every shift over the course of 8 weeks, resulting in 156 BP readings. The readings occurred 10 minutes before the beginning of a shift (giving a baseline reading), when the GN took a break toward the middle of the shift, and at the end of the shift. At each time, the GN recorded the BP readings on a provided data sheet (see Appendix E). Because posture can affect BP, the GN chose to stand for every reading. To increase accuracy over un-automated methods, an automated Critikon Dinamap Plus Vital Signs BP Monitor was used. To prevent against the behavioral phenomenon of "white

coat hypertension," where the presence of a medical professional can increase stress, and to allow for more frequent readings, the GN self-administered the BP readings.

To decrease equipment-induced error, the GN used the same BP machine every time. The BP machine was allocated to the Unit for the purposes of the study and marked "Not for Clinical Use." The BP machine was kept in the staff locker room, providing a quiet and convenient location. Proper cuff size was determined for the GN prior to data collection, and the same cuff was used throughout.

2.8 Survey

A paper/pencil survey was developed to measure opportunities for informal learning, nursing unit culture, and perceived stress levels (see Appendix F). The original intention was to administer the survey three times to the GN. However, because orientation for the target NG was unexpectedly cut short, the survey was administered twice:

1. The end of week 2, when the GN had some experience of the Unit but was still in the early stages of orientation
2. The end of week 7, a week before the end of orientation. The second survey was administered to provide a comparison with the first survey, and assess whether there were changes over time.

The survey was also administered once, as originally planned, to the Orientor and 11 RN's who had worked on the Unit for at least one year, and who worked during the hours of 7am – 3pm. The purpose was to provide a baseline assessment of the Unit, for comparison with the GN survey responses. Consent was received from all staff to use the survey results in the study (see Appendix B for staff consent form).

The survey consisted of the following three parts:

1. Part I: Opportunities for informal learning

2. Part II: Nursing-unit culture

3. Part III: Perceived Stress Levels

Part I & II were developed by the researchers by combining questions from three different sources:

1. *A Comparative View of Employee Perceptions of Their Workplaces as Learning Environments* (Coetzer, 2006). A survey was developed specifically for this study, and addressed five areas of learning in the workplace: learning opportunities, support for learning, supervisor's proximate support for learning, satisfaction with learning, sources of learning, and methods of learning. All survey items had a Cronbach's Alpha score greater than .70.

2. *Measurement of Work Satisfaction Among Health Professionals* (Stamps et al., 1978). A survey was developed to measure job satisfaction of health professionals, and addressed six areas: pay, autonomy, task requirements, administration, interactions, professional status, doctor-nurse relationship. The Cronbach's Alpha score for all 48 items was .912, and the intra subscale reliabilities ranged from .70-.85.

3. *Measuring Organizational Traits of Hospitals: The Revised Nursing Work Index* (Aiken & Patrician, 2000). This frequently sighted revision of the NWI is used to characterize professional nursing environments and addresses four key aspects: nurse autonomy, nurse control over practice setting, nurse-physician relationship, organizational support. The Cronbach's Alpha for the entire instrument was .96, and the intra subscale reliabilities ranged from .85-.90. Note: the original Nursing Work Index was first developed by Kramer & Hafner (1989), and was published in *Shared Values: Impact on Staff Nurse Job Satisfaction and Perceived Productivity.* Nursing Research, 38, 172-177.

When the survey was administered the items for Part I & II were randomly combined. A 7-point Likert scale was used to measure the extent to which the nurses agreed with the statements, ranging from Strongly Disagree (1) to Strongly Agree (7).

Part III kept in-tact the most frequently cited Nursing Stress Scale, developed by Gray-Toft & Anderson (1981). The purpose of Part III was to assess the nurses' *perceived* stress levels to see if there was any correlation with the biological stress response, measured by BP. The instrument addresses the physical, psychological and social environments and focuses on seven aspects of nurse stress: death and dying, conflict with physicians, inadequate preparation, lack of support, conflict with other nurses, work load, uncertainty concerning treatment. The inter-item reliability of the instrument was tested using four different methods, and scores ranged from .80-.90. The items from Part III were kept separate from Part I & II, and were rated using a different 4-point scale. Nurses were asked how often, on their present unit, they found the following situations to be stressful: never (1), occasionally (2), frequently (3), very frequently (4).

2.9 Competency

Crouse Hospital has a well-established12-week orientation program for GN. On the Unit, the GN is paired with a single Orientor - a skilled registered nurse who has been working on the unit for at least 3 years and has been identified by the nurse manager as someone skilled in teaching. During the orientation period the Orientor and the GN share the same patients. The targeted GN was paired with an Orientor who had been working on the Unit for fifteen years, and who had developed a unique orienting shift-schedule where the GN and Orientor worked four 10-hour shifts each week, leaving two hours at the end of each shift for "targeted practice." The time

allotted for "targeted practice" was used to go over skills that the GN required extra practice on (such as hanging chemotheraphy), by either working directly with a patient, practicing procedures in a quiet area such as the break room, or watching and discussing video tutorials. At the end of every week the Orientor documented the GN competency thus far by recording the degree to which weekly goals had been met, and checking whether particular skills and procedural knowledge had been gained or not. These weekly evaluations were available to the researchers for analysis.

However, because we were interested in a more sensitive analysis of gaining competency over time, we added an additional competency evaluation tool, developed by two clinical nurse specialists (one from the Unit), three nurse managers (one from the Unit), the Unit Orientor, and the research team. The additional tool consisted of 18 competency categories that were each rated on a 10-point Likert scale (see Appendix G for tool, and Appendix H for competency category definitions). The same 18 competencies were rated each week during the Orientor's weekly evaluation of the GN, using Dr. Patricia Benner's Novice to Expert rating scale. Dr. Benner identified five levels of competency in clinical nursing: novice, advanced beginner, competent, proficient, and expert (Benner, 1984). The new tool focused on the GN ability to think critically in a variety of areas, versus simply mastering a medical procedure.

2.10 Focused Interviews

Five focused interviews were conducted at various times throughout the study, to obtain a deeper understanding of the Unit, GN interaction and communication patterns, influences on stress, and how and why different locations on the nursing units were used (or not) for communication and informal learning. Interview guides were developed for each interview, but questions were revised and probes used whenever

needed (see Appendix I for an example interview guide). A floor plan of the Unit was given to the interviewee to help them talk about the design of the unit. All interviews were audio-recorded with the permission of the interviewee (see Appendix B & C for consent forms).

The first focused interview was with the GN during the first week on the unit floor. The GN had worked for 1.5 years on the Unit as the unit receptionist prior to graduating from Nursing School. We felt it was important to understand this experience, and how it may have influenced her relationship with the Unit, knowledge of unit procedures and policies, and therefore overall competency and stress levels at the start of orientation.

The second focused interview was with the Unit's nurse manager, and sought to understand the organizational, social and technical systems of the unit, and how they possibly influenced communication, learning and stress on the Unit.

The last three focused interviews focused more on the physical system of the Unit. One interview was with a nurse practitioner who worked on four different medical units at Crouse, and therefore was able to provide a unique comparative perspective. The other two interviews were with the GN and Orientor, and focused specifically on the learning process of the GN and the role played by the physical environment in opportunistic communication, informal learning and stress.

2.11 Field Notes

The researcher carried a notepad during all observation periods to record field notes. The purpose of recording field notes was to note any new or unusual circumstances during the observation period, such as the occurrence of a medical emergency on the unit or the assignment of nursing students to the GN. Relevant comments by the GN or other Unit staff members were also noted, such as "today is a

particularly stressful day" or "the GN is working very independently today." These

notes were used during data analysis to help explain observed patterns of

communication and interaction, competency levels and stress.

CHAPTER 3

RESULTS

3.1 System Analysis of the Nursing Unit

Through field observation, focused interviews with Unit staff members, and survey analysis, the nursing unit system was analyzed to generate a deep understanding of the organizational ecology of the study site. The system was analyzed from three perspectives: Physical Layout, Information Management & Technology, and Organization & Unit Culture.
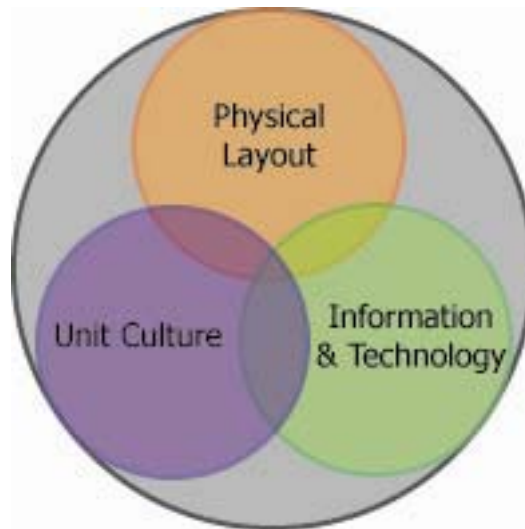
3.1.1 Physical Layout

As figure 4 illustrates, the 661 SF nursing unit can be generally classified as a centralized unit where the unit receptionist, charge nurse, social worker, nurse manager, clinical work areas and medication room are clustered together in a central location with respect to patient rooms (218 and 119 SF). The Unit consists of open desk space that wraps around an enclosed central core, behind which are enclosed storage rooms. The unit receptionist and charge nurse desks are adjacent at the front of the Unit, and easily accessible by staff, patients and family (see figure 5). The

social worker has a designated space at Desk C (see figure 4 & 6). All other desk space in the Unit is unassigned and can be used by any clinical staff (see figure 7). However, Desk A is unofficially known as the doctor's desk (see figure 4 & 5). The nurse manager is the only staff member with an enclosed office, which is located in the central core and is often used for private meetings. There are two types of medication areas, one for narcotics and the other for milder, patient-specific medications, located in the central core. The open medication area (see figure 8) is split in half by a partial barrier, where one side stores narcotics and the other side is used as a storage and prep area, with a bench, sink and mini-fridge. This area has no visual or acoustical privacy from the unit. The two smaller open medication areas (see figure 9), located in the corners next to the charge nurse and registered nurse, consist of a small medication cart and desk area. Each medication cart serves its respective side of the unit, and contains milder patient-specific medications, such as Benadryl. Similar to the larger medication area, there is no visual or acoustical privacy. The enclosed staff break room (see figure 10) is located on the unit within the central core, and is used by staff for eating, taking quick breaks, or for more formal meetings, such as when the GN and preceptor meet for weekly competency evaluations. The break room has a table that can seat five people, a bookshelf with reference materials, and tackable wall surfaces for posting notices, announcements, articles, and reminders for the clinical staff.

A few storage carts sit in the corridors outside patient rooms, and are often used for charting by nurses (see figure 11). However, the majority of supplies are kept in either the supply room or the corridor shelving units directly outside the supply room (see figure 12). The kitchen is used to store food and drinks for patients, while the locker room is used by staff to store their personal belongings and food (see figure 13). Up-to-date patient charts are kept in a storage rack above desk A, while charts

requiring updates are kept in a movable cart that sits between the charge nurse and the unit receptionist (see figure 14).

Despite the open desk areas, visibility within the unit is obstructed by the presence of two corner walls, separating the smaller medication areas from the charge nurses and unit receptionist desks (see figure 15). In addition, the location of the central core further obstructs visibility across the unit between desks B and C.
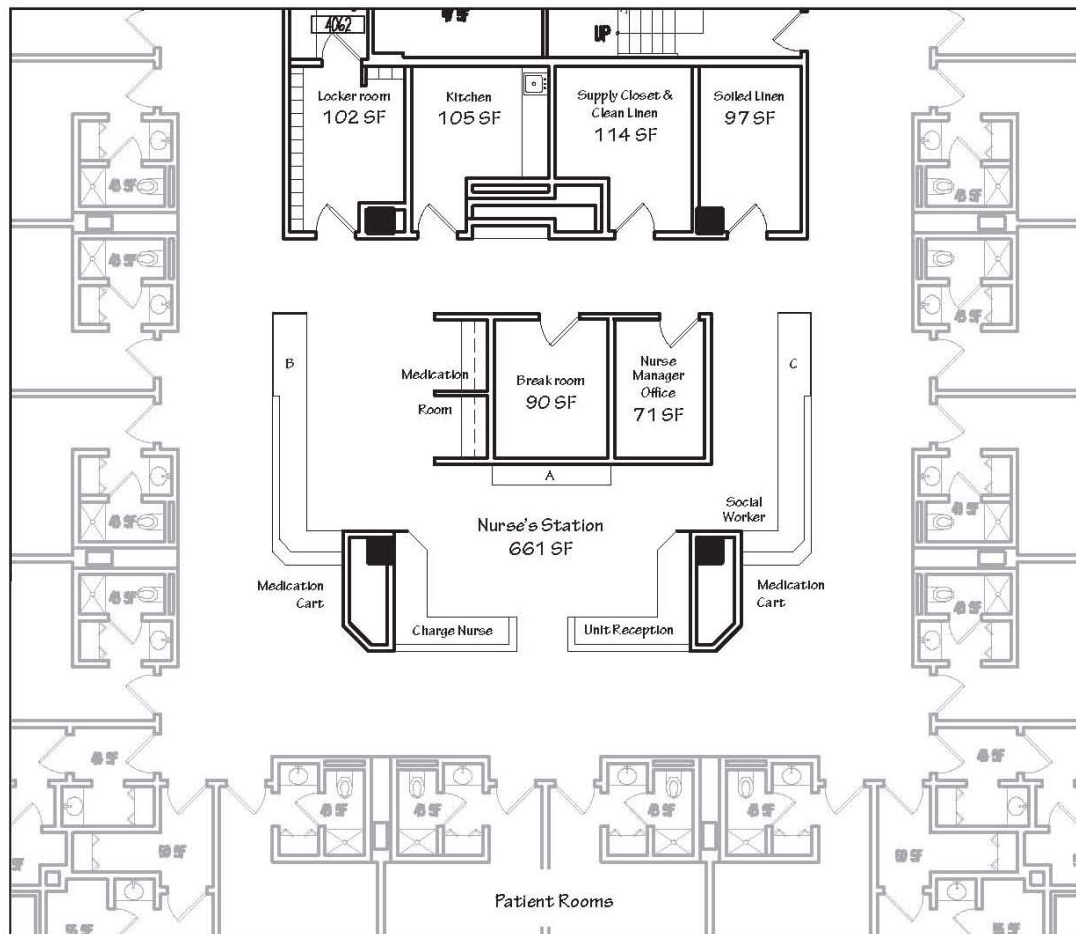
Figure 4 Nursing unit floor plan

Doctor's Desk

Unit Receptionist

Charge Nurse

Figure 5 Adjacent CN and UR desks at front of Unit. Unofficial Doctor's desk.

Figure 6 Social Worker's desk at the corner of Desk C (see Figure 1)

Figure 7 Unassigned workspace at Desk C

Figure 8 Desk B in front of open medication area containing narcotics and prep area

Figure 9 Small corner medication area containing milder patient specific medications

Figure 10 Break room whiteboard used to post announcement and messages

Figure 11 Supply cart outside patient room often used for charting by Nurses

Figure 12 Corridor storage shelves and cart outside supply room

Figure 13 Staff locker room used for staff's personal belongings

Figure 14 Patient chart shelf and cart, sitting between UR, CN and doctor's desks

Figure 15 Limited visibility through Unit due to corner wall

3.1.2 Information Management and Technology

1. Patient records and assignments

Patient medical records are kept on paper, and separated into nurse's records and doctor's records. Nursing charts are kept by the patient bedside, which the doctor is meant to refer to before seeing a patient. Doctor's notes are kept in the patient's permanent file. Every few days, the nursing charts are put into the patient's permanent file.

Nurse's patient assignments for each shift are recorded on a paper chart that is kept at the charge nurse desk. Patient room assignments and patient doctors are recorded on a large whiteboard on the wall opposite the unit receptionist.

2. Medications

Medications are stored and dispensed using Pyxis, the automated medication and supply management system by Cardinal Health. Each clinical staff member has a unique entry code for accessing medications from the Pyxis. Crouse Hospital's Net Access, accessed from unit computers, is used for entering all patient care services, such as tests, nursing orders (labs, dietary etc), as well as viewing medication orders and lab results. As a result, a nurse's decision of where to sit in the Unit is often dictated by the availability of a computer.

All medication orders are faxed directly to the Pharmacy department. Medication information for each patient is also kept on paper at each smaller corner medication area.

3. Staff locator system

The Hill-Rom COMLink Nurse Communication System is used to provide instant, hands-free communication among clinical staff and patients. Each clinical

staff member wears a small wireless device, which enables them to be located when they are in the patient room. Each patient room contains a monitor where the Nurse can check to see the location of a patient somewhere else on the unit who requires assistance. The monitor can also be used as an Intercom to communicate with that patient (i.e. to calm the patient and assure them you'll be there in 10 minutes). A red call light located outside the patient room also lights up when a patient needs assistance. However, when a nurse is looking for someone, it is more likely to ask someone near by, rather than use the Hill-Rom.

4. Information resources

Hospital's Care Notes, accessed from unit computers, are used for patient education resources. Clinical staff can print patient-ready educational sheets that explain medical conditions, treatments and medications in laymen's terms. Clinical staff use Crouse Hospital's internal search engine to find policy and procedure information. The internet is also available on all unit computers if clinical staff need to research medical questions.

The unit manager communicates with unit staff via their Crouse email accounts. However, the most common method is posting information (i.e new procedures, reminders, schedules etc) in the break room and in the locker room's bathroom.

3.1.3 Organization and Unit Culture

The Unit began as an Oncology unit, but later merged with Gynecology. Recently the unit has accepted more medical patients. While the Unit still primarily serves Oncology/Gynecology patients, the addition of medical patients creates a challenge for the Nurses as they have had to not only learn new clinical skills but,

more challenging, learn how to work with different doctor work styles. As once nurse commented, adjusting to new styles results in "shell shock for a while."

> "Some doctors you don't even bring up suggestions because they're not going to go for it, versus other doctors who are looking for nurse's suggestions. It's about knowing your doctor, knowing your audience, and how to get a suggestion through without a negative response."

The most recent organizational change on the Unit was the temporary absence of the nurse manager, who left at the beginning of the study to assist another unit in the Hospital. For the duration of the study, the daytime charge nurse filled the position of nurse manager, and a registered nurse filled the position of charge nurse. Both nurses were very experienced and well-known by the staff. According to focused interview responses, the change of nurse manager was not a source of stress or concern for the staff.

The Unit was stretched to capacity during the study due to changes in staffing and high patient census. The unit experienced unusually high turnover of senior nurses and leaves of absence during the six months leading up to the study. During the study the patient census ranged from 33-36, versus the standard range of 25-27. As a result, the daytime patient to staff ratios increased, going from 4:1 to 5/6:1. One reason for the increased patient census is that January – March (study period) is the 'sickest' time of the year. Another reason is that Crouse Hospital had an influx of OB-GYN's prior to the beginning of the study, which in turn increased the number of Gynecology patients entering the Unit.

Given the high patient acuity (9.1/10) and high number of Oncology patients requiring end-of-life care, the Unit staff were constantly faced with death and dying. For this reason, the burnout rate of new nurses was particularly high, often within two years. However, the nurses who did not burnout were those who found Oncology a

natural fit and often stayed on the Unit for 10-20 years, creating a unified unit of registered nurses.

Because the Unit primarily served Oncology/Gynecology patients, most of the doctors were regulars on the Unit and were familiar with both the Unit and with the nursing staff. The majority of the allied health staff were employed by Crouse, and many were familiar with the Unit. In particular, the dieticians, who were crucial members of the Oncology/ Gynecology care team, were regulars and spent time on the Unit every day. This familiarity facilitated a uniquely comfortable relationship between registered nurses, doctors and allied health.

The unity between staff on the Unit was reiterated by the registered nurses' (n=12) responses to the culture section of the survey (see figure 16; see Appendix F for complete survey). The inter-item reliability of the culture section was calculated after the survey had been administered using Cronbach's Alpha, and found to be acceptable (n=22; α=9.1). The mean rating for all questions was 5.5 (1-7 scale where 7=strongly agree), and only two questions had a mean rating below 5. One of those questions was "Doctors show respect for the skills and knowledge of the nurses on my unit (X^2=4.67)." Despite a somewhat lower rating for level of respect from doctors, the nurses' highest mean ratings (X^2=6.1) were for "Physicians and nurses on my unit have a good working relationship" and "Nurses on my unit share knowledge and expertise with one another." The next two highest scoring questions (X^2=6.0) were "New and innovative ideas about patient care are encouraged on my unit" and "Nurses on my unit often share their learning experiences with each other," followed by "A feeling of unity exists within my unit (X^2=5.92)." To quote directly from a focused interview, "I've been here for 15 years and everyday I have to ask somebody something or they ask me something…If I'm having a bad day I can go over to a number of any one of my friends and 'what can I do for you' – that's what they would

say to me. There's a bond." When asked why the Unit has relatively low turnover, interviewees unanimously agreed it was due to the staff and the "unbelievable" Nurse Manager, who sets the tone of the entire Unit. According to a nurse, "You can go up to her, talk to her about anything, and you know it will stay with her…if she has to address an issue she's very professional." Based on survey responses ($X^2=5.5$), focused interviews and observation, the Unit culture can be generally characterized as trusting, unified, collaborative and supportive, with various staff members working together and sharing information and knowledge.
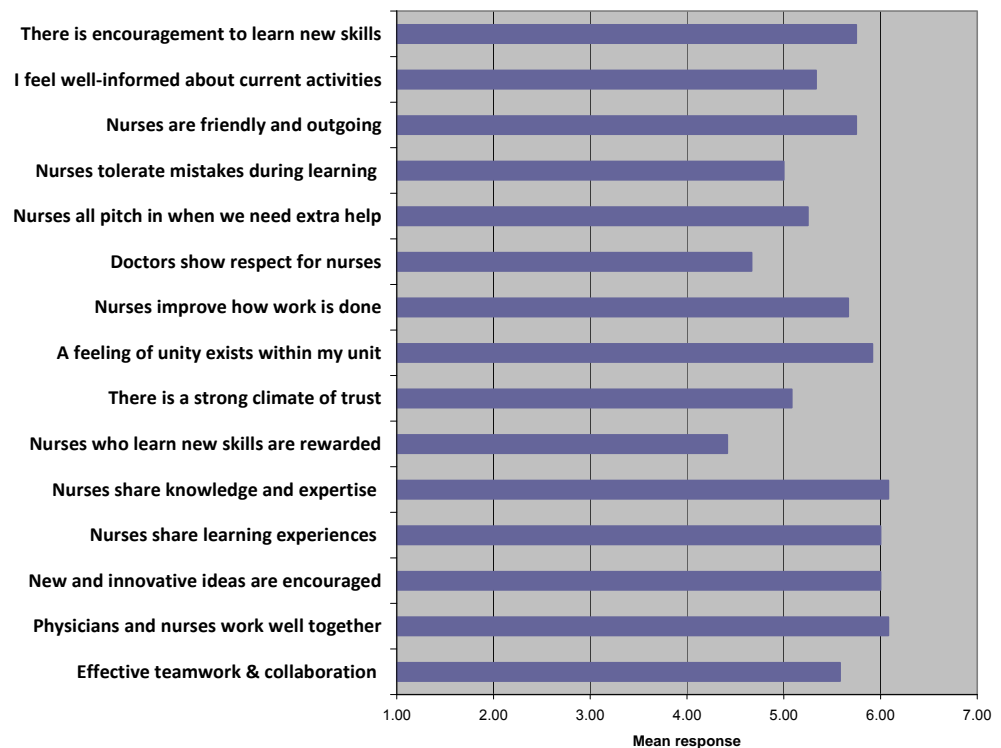
Figure 16 Mean registered nurse responses to culture section of survey (1-7 scale; 7=strongly agree)

3.2 Graduate Nurse's Familiarity with the Nursing Unit

A focused interview at the beginning of the study revealed that the GN had worked on the Unit as the weekend unit receptionist for 1.5 years, while studying at the Crouse Hospital School of Nursing. This experience meant that the GN began orientation very familiar with administrative tasks, and was very comfortable and familiar with the nurses and doctors. However, the GN had no experience with medications. The transition from nursing school was easier because the GN:

a. Felt comfortable communicating with the staff, such as "raising a concern, approaching a physician and asking a registered nurse to cover a patient during lunch."

b. Knew the work ethic of the unit.

c. Understood the paperwork and knew where everything was located in the unit.

The transition was easier for the Unit as a whole because staff knew the GN. The GN familiarity with the Unit was reflected in the mean culture survey response ($X^2=5.6$), which was very similar to the staff assessment of the Unit culture ($X^2=5.5$; see figure 17). The survey was administered at Week 1 and Week 7 of orientation to test if the GN perception of the Unit changed over time. However, no significant change was found, so the means for T1 and T2 were combined. While the GN primarily viewed this familiarity in a positive light, she was concerned that the Unit would have higher expectations of her performance as a nurse because the staff knew her and had seen her excel in the role as unit receptionist.
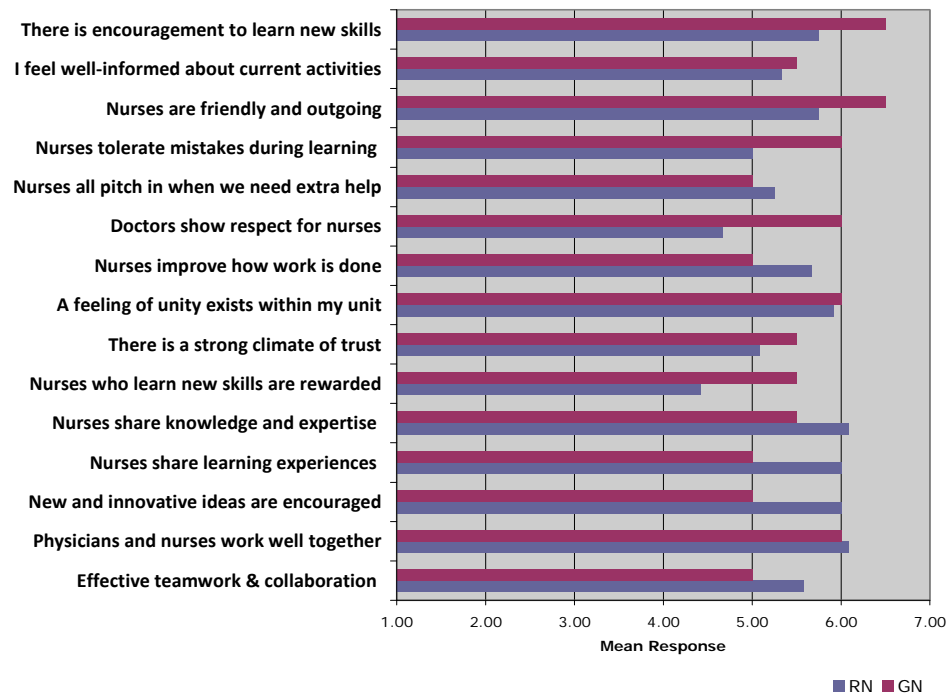
Figure 17 Mean registered nurse & GN responses to culture section of survey (1-7 scale; 7-strongly agree)

3.3 Communication and Interaction Patterns

The communication and interaction patters of the GN were analyzed from Week 3 of Orientation through Week 9. Analysis began in Week 3 because the first week of Orientation was spent in the classroom and therefore no data could be collected, and the data collected for Week 2 was discarded due to poor reliability. A total of 1816 interactions over 23 hours were recorded. Data was collected on interruptions and multi-tasking. However, in order to stay focused on the original research question – who the GN was interacting with, about what, and where - this data was not analyzed. The data was analyzed by overall percent and frequency of interactions, average frequency during an 8-hr shift (by calculating frequency/minute for each data collection session, extrapolating to an 8 hr frequency, and then

averaging), average time per interaction, and average time of each interaction during an 8-hr shift. The data was also analyzed by week to assess whether there was change over time. Observation and responses from focused interviews were used to further make sense of the CWM data.

3.3.1 Analysis by Task

a) Frequency

Table 2 shows the percent and frequency of each task over the entire seven weeks of data collection, and the average frequency during an 8-hr shift. The task category Seeking Advice was eliminated because, during collection, it was determined that the category Validation was a more appropriate category for describing the interactions of the GN, based on the task definitions (see Table 1; see Appendix D for complete definitions). The GN was encouraged by the Orientor to always propose a solution, even if she was unsure. Therefore, when the GN sought out the Orientor or a nurse for advice, it was to *verify* a solution, rather than simply being given a solution. An insignificant amount of data was lost by eliminating the Seeking Advice category. The In Transit category was used to record how frequently the GN walked between locations on the Unit. As table 2 shows, approximately one third of the GN tasks were In Transit (188 times on average during an 8-hr shift), which agrees with findings from previous research. Looking only within the communication categories (see Figure 18), one third of the GN communication was Discussing Patient Care (33.3%), 26% was Social, and 13.3% was Validation. During an average 8hr shift, the GN had 55 Social interactions, Discussed Patient Care 65 times, and interacted with a patient 105 times (see figure 19).

Table 1 Task definitions for CWM Tool

	Task	Definition
	Task	**Definition**
	Patient	In patient room alone
	Patient Interactive	In patient room with at least one other person
	Non Interactive	Any task done alone, outside of patient room
	In Transit	Walking between tasks (non-interactive)
Communication	**Social**	Interaction that is non-work related; or venting about work
	Administrative	Activity that relates to running of the ward i.e scheduling
	Being Taught	Actively being taught new skills or information; initiated deliberately by other staff member
	Seeking Assistance	Assistance with equipment, procedures, locating people. Important: does not indicate lack of skills or knowledge
	Seeking Advice	Advice or guidance when lack skills or knowledge
	Discuss Patient Care	Discussing patient status or care plan with staff or visitor
	Validation	Verifying the accuracy or appropriateness of a decision, procedure, care plan or strategy
	Provide Assistance	Assistance with equipment, procedures, locating people. Important: does not indicate lack of skills or knowledge
	Provide Advice	Advice or guidance when lack skills or knowledge

Table 2 Overall percent & frequency of each task, and average frequency/8hr

	Task	Percent (%)	Frequency	Frequency/8hr
	Patient	8.2	149	56.87
	Patient Interactive	7.3	132	48.92
	Non Interactive	23.4	425	148.24
	In Transit	29.1	528	187.94
Communication	**Social**	8.2	149	55.06
	Administrative	1.6	29	10.45
	Being Taught	2.2	40	14.98
	Seeking Assistance	1.5	28	10.44
	Discuss Patient Care	10.5	191	65.74
	Validation	4.2	76	26.58
	Provide Assistance	2	37	13.3
	Provide Advice	1.3	23	7.56
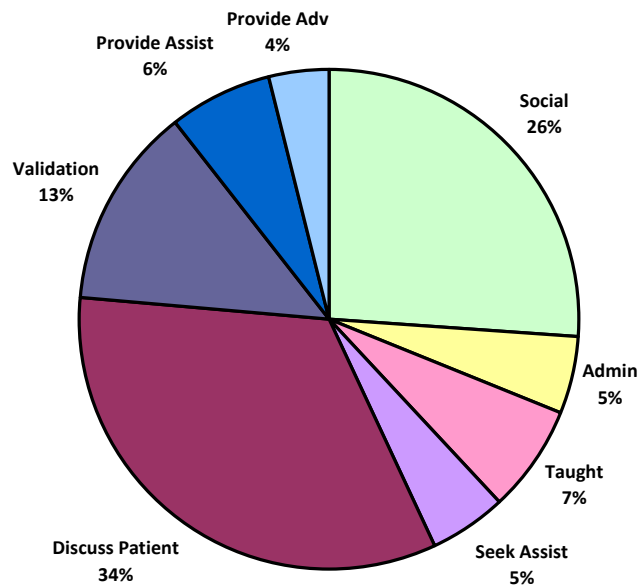
Figure 18 Overall frequency(%) of communication tasks by type (excluding "In Transit")
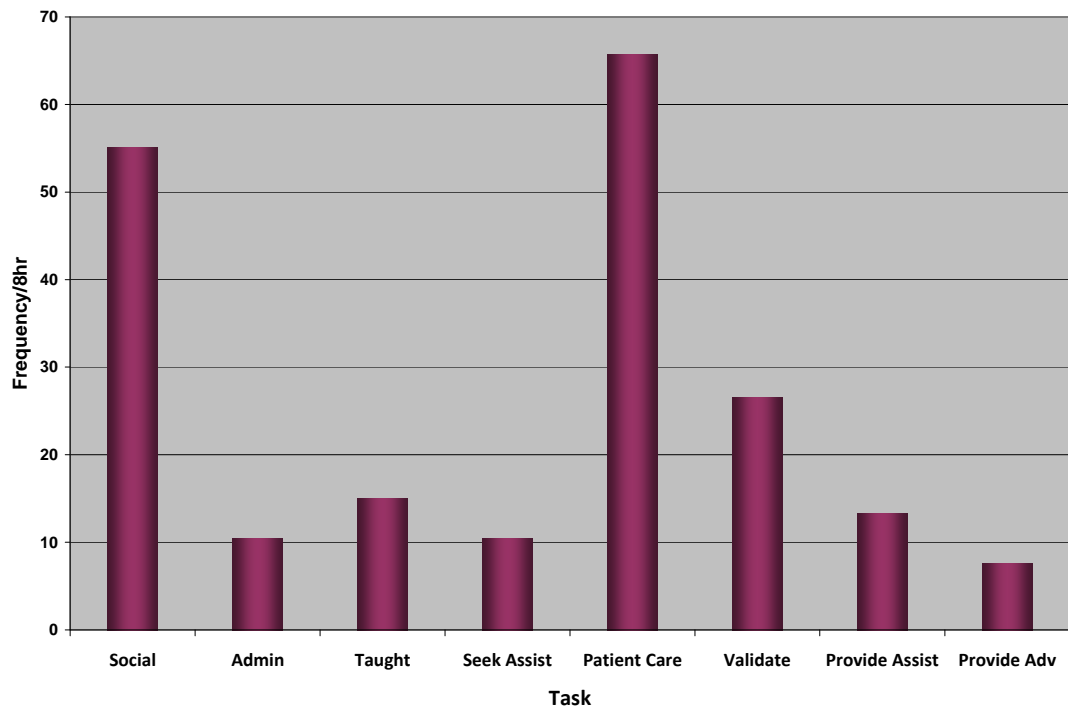
Figure 19 Average frequency/8hr shift of communication tasks

Table 3 shows the frequency (%) of each task within each of the seven weeks, and illustrates how the interaction patterns of the GN changed over time. The In Transit data was excluded from the frequency(%) calculations to highlight changes over time in the communication categories. Four of the communication categories show a change over time – Social, Being Taught, Discussing Patient Care, and Validation. The Patient and Patient Interactive categories were combined in this table. They were originally kept separate to assess whether the GN worked more independently in the patient room over time. However, there was no pattern over time for either independent or interactive time spent in the patient room. The GN began Providing Advice in Week 5. Observation revealed that the GN Provided Advice to nursing students from Crouse Hospital School of Nursing. There were no nursing students on the Unit in Week 9 when data was collected.

Table 3 Frequency(%) of tasks for each week of data collection

Task	Frequency(%) per week						
	3	4	5	6	7	8	9
Patient	31.5	10.5	23.3	21.5	19	17	26.5
Non Interactive	31.5	45.1	31	33.1	34.4	25.2	33
Social	7.7	15.8	9.1	12.2	11.6	12.2	13.5
Admin	1.5	0.8	1.4	1.7	2.1	2	5.2
Being Taught	7.7	3.8	5.6	2.3	1.6	0.7	0.4
Seek Assistance	2.3	2.3	3.1		2.1	4.1	1.3
Discuss Patient Care	9.2	6.8	10.1	19.8	20.6	22.4	15.2
Validation	6.9	7.5	10.8	5.2	3.2	4.8	1.7
Provide Assistance	1.5	1.5	3.8	2.3	3.7	3.4	2.6
Provide Advice			1.7	1.7	1.6	8.2	
Total (%)	100	100	100	100	100	100	100

Looking at the four communication categories that showed a pattern of change over time (see figure 20), Social interaction increased by 75% and Discussing Patient Care increased by 65%, while Being Taught decreased by 95% and Validation decreased by 75%. During Week 5, Being Taught and Validation increased slightly,

and Social interaction decreased. According to field observations, and Orientor evaluation notes, during Week 5 the GN began learning how to administer chemotherapy for the first time, and also changed from having three patients to four. During Week 8, Validation and Discussing Patient Care both increased. During the same week, the GN experienced a patient coding for the first time.
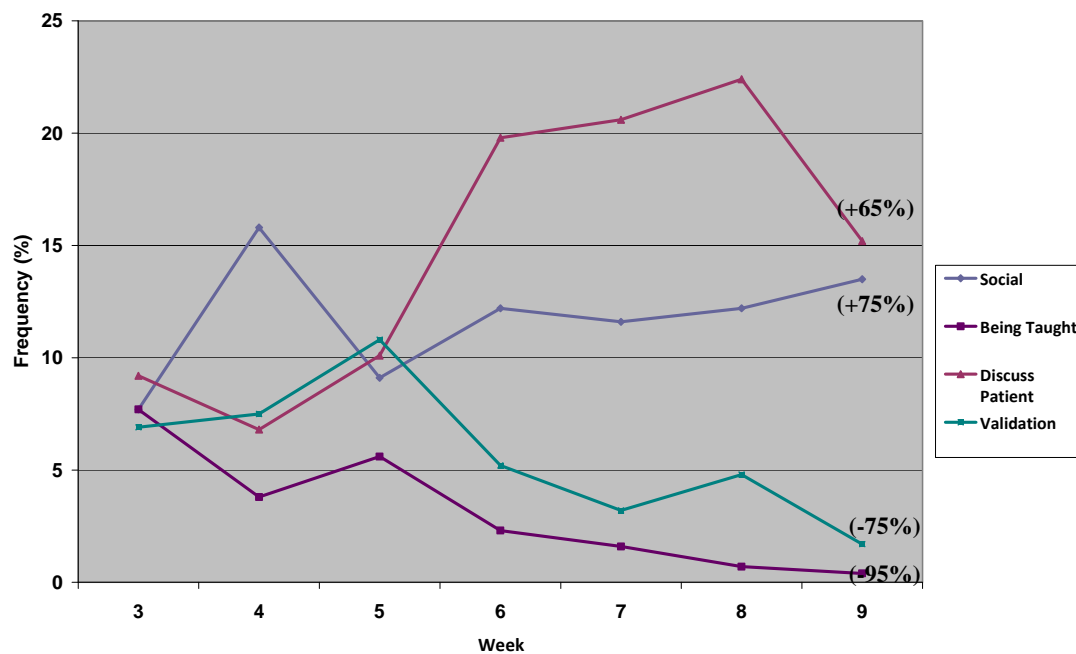
Figure 20 Frequency(%) of communication tasks that show a pattern of change over time

b) Time

The percentage of total time (over 23 hours of data collection) spent on each communication task shows a similar distribution as the frequency(%) analysis, with Discussing Patient Care (34%) predominating, followed by Social interaction (20%) and Validation (20%) (see Figure 21). Analysis by average time of a single interaction (see Table 4) shows that the interactions were brief and opportunistic. In particular,

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Being Taught (56s) and Validation (51s) had the longest average times, followed by

Discussing Patient Care (34s), and Social interaction (25s) (see figure 22). Table 4

shows that, even though each Transit event only averaged 16s, the GN spent an

average of nearly 1 hr walking during an 8 hr shift. Furthermore, over 3 hrs were

spent providing patient care, and 2 hrs were spent in non-interactive tasks. While

Discussing Patient Care was shown to be most frequent, only 37 min were spent on

average during an 8 hr shift.

When the time data was analyzed by week, there were no patterns of change

over time, unlike with the frequency(%) data.

Table 4 Total time (over 23 hours of data collection), average time per task, and average time per task during an 8hr shift

Task	Total Time	%	Avg Time	Avg Time/8hr
Patient	4:28:20	20%	1:48	1:42:20
Patient Int	4:37:56	20%	2:06	1:42:40
Non Int	6:02:57	26%	0:51	2:06:00
In Transit	2:22:46	10%	0:16	0:50:05
Social	1:01:56	5%	0:25	0:22:50
Admin	0:16:43	1%	0:35	0:06:05
Being Taught	0:37:14	3%	0:56	0:14:00
Seek Assist	0:08:29	1%	0:18	0:03:05
Patient Care	1:49:13	8%	0:34	0:37:20
Validate	1:04:43	5%	0:51	0:22:35
Prov Assist	0:09:10	1%	0:15	0:03:20
Prov Adv	0:09:48	1%	0:26	0:03:15
Total	**22:55:40**	100%		
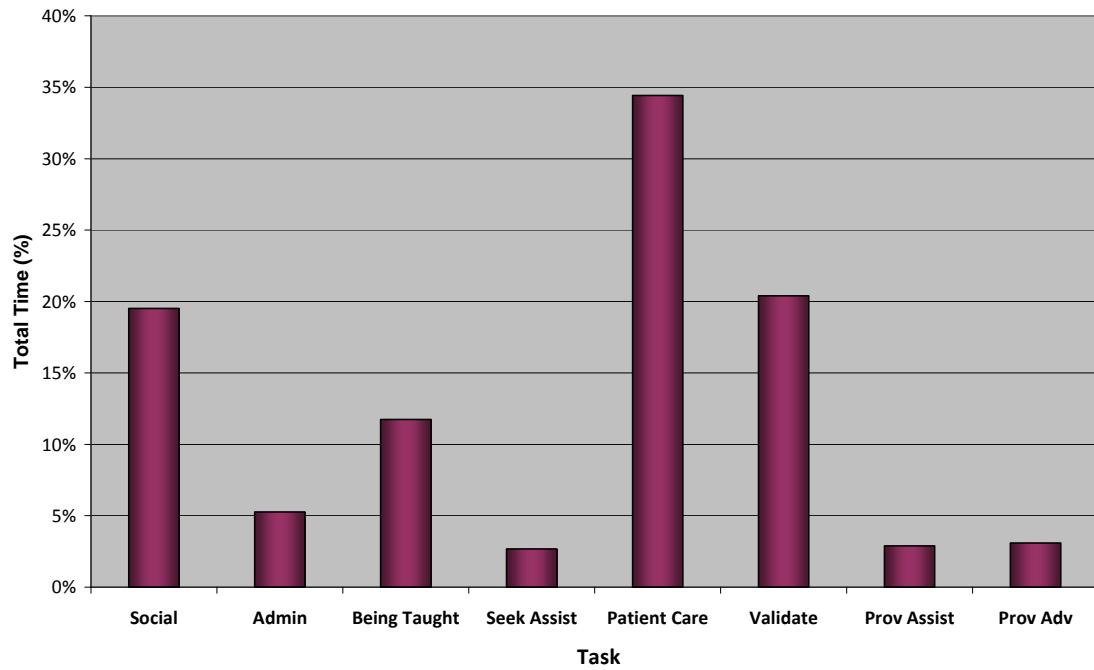
Figure 21 Percentage of total time (over 23 hours of data collection) spent on each communication task
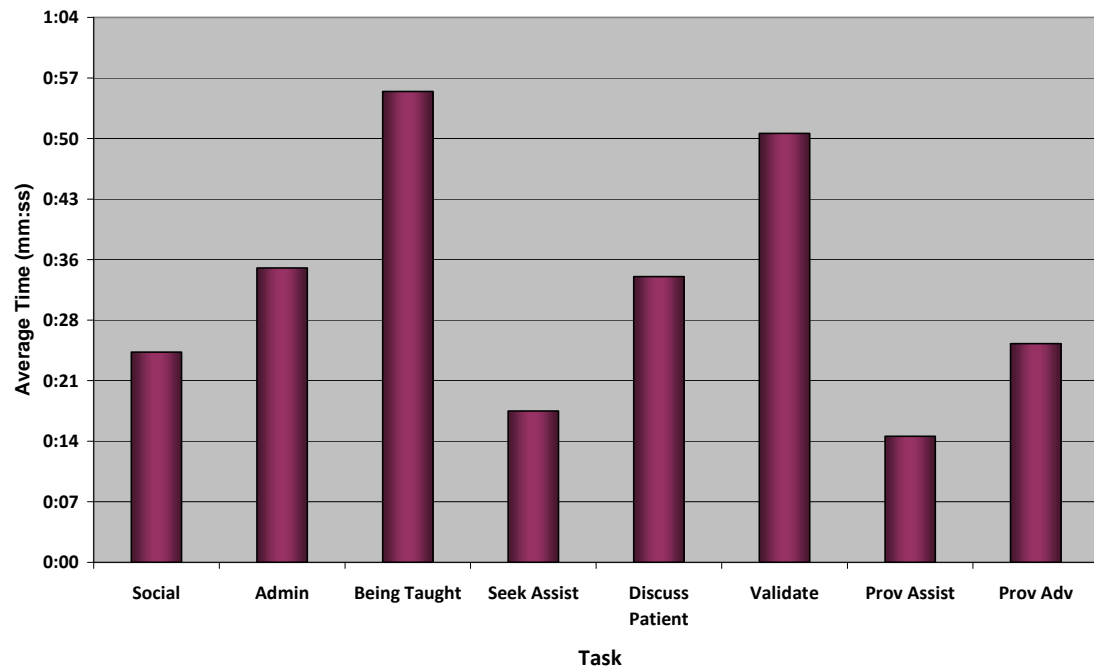
Figure 22 Average time of a single interaction, for each communication task

3.3.2 Analysis by Person

a) Frequency

Table 5 shows the percent and frequency of who the GN interacted with over the entire seven weeks of data collection, and the average frequency during an 8-hr shift. The Allied Health category primarily represents interactions with Nursing Aids. The Nurse category primarily represents interactions with registered nurses, but also includes nursing students. The New Nurse Graduate category was only used during Weeks 7-9 when a second Graduate Nurse began orientation on the Unit. One third of GN activities were done alone (33.0%). Looking only at who the GN interacted with (see figure 23), 33% of interactions were with the Orientor, 26% were with a patient, and 20% with a nurse. During an average 8 hr shift, the GN interacted 124 times with the Orientor, 80 times with a nurse, and only 8 times with a doctor (see figure 24).

Table 5 Overall percent and frequency of who the GN interacted with, and average frequency during 8hrs

Person	Percent (%)	Frequency	Frequency/8hr
Work Alone	33	425	148.2
Patient	22.4	288	97.67
Visitor	5.9	76	27.36
Nurse	16.6	214	80.5
Doctor	1.9	25	8.2
AH	8.5	109	35.03
Orientor	28.1	362	124.3
NNG	1.7	22	11.09
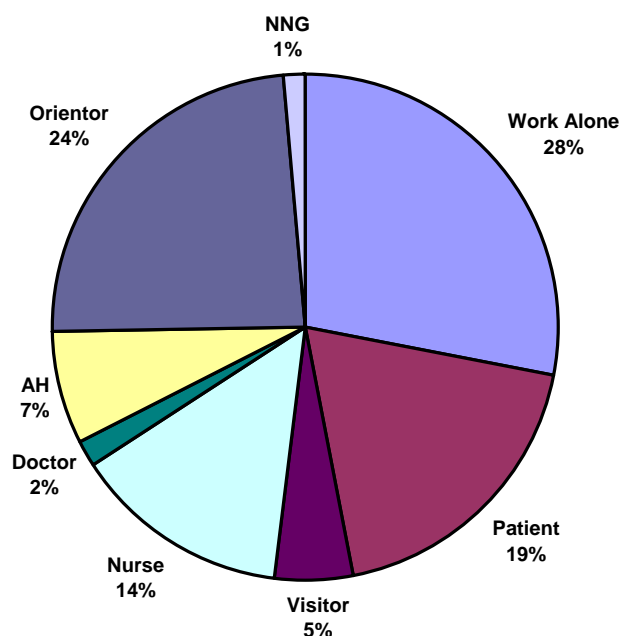
Figure 23 Overall frequency(%) of who the GN interacted with (over 7 weeks of data collection)
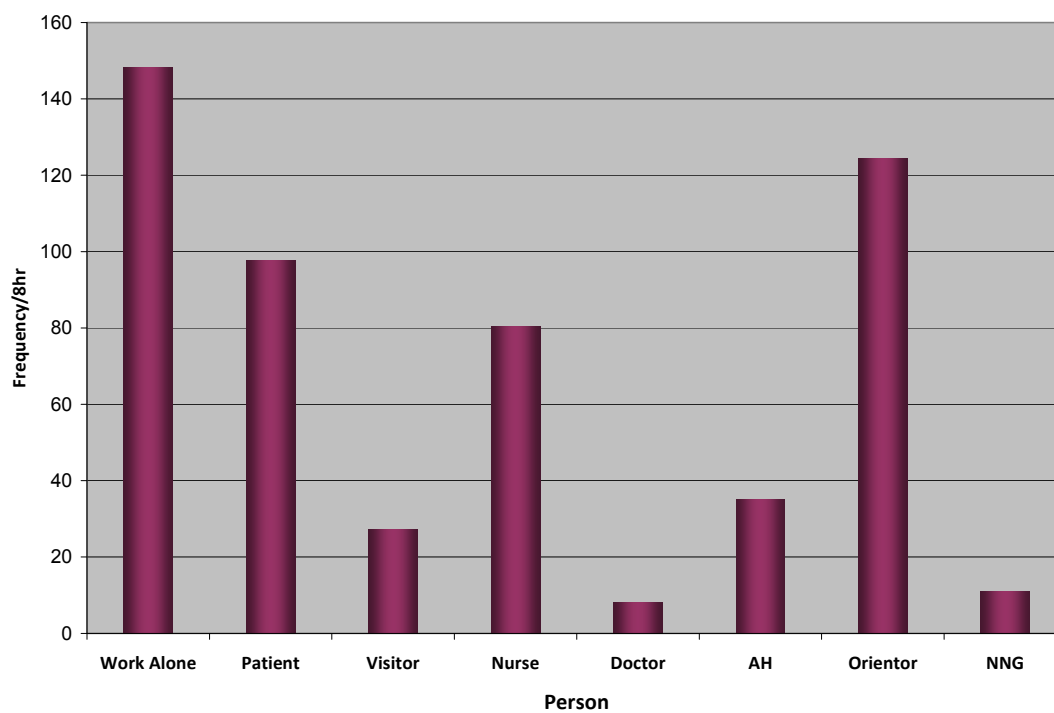
Figure 24 Average frequency/8hr shift of who the GN interacted with

Table 6 shows the frequency(%) of who the GN interacted with in each of the seven weeks, and illustrates how the interaction patterns of the GN changed over time. The patterns were not as distinct as those observed in the task data. However, as figure 25 illustrates, frequency of interaction with visitors (mostly patient's family members) increased over time. Interactions with nurses increased steadily over time, except in Week 9. The sudden decrease from 32 % to 8.7% could have been due to the absence of nursing students, who were recorded as nurses, during Week 9 of data collection.. The GN interactions with the Orientor increased during Week 5 (35.2%), and by Week 9 were down to the same frequency as Week 3 (27%). Week 5 was also the week that the GN began learning how to administer chemotherapy for the first time, and changed from having three patients to four.

Table 6 Weekly frequency(%) of who the GN interacted with

Person	Week						
	3	4	5	6	7	8	9
Work Alone	31.5	45.1	31.0	33.1	34.4	25.2	33.0
Patient	31.5	12.8	24.7	21.5	19.0	17.0	26.5
Visitor	1.5	1.5	5.9	3.5	7.9	11.6	7.4
Nurse	15.4	10.5	12.9	18.6	23.3	32.0	8.7
Doctor	0	4.5	1.7	1.2	1.1	0	4.3
AH	8.5	3.8	9.4	11	13.2	2	8.3
Orientor	26.2	24.1	35.2	27.9	23.3	27.9	27.0
NNG	0	0	0	0	0.5	11.6	1.7
Total (%)	100	100	100	100	100	100	100
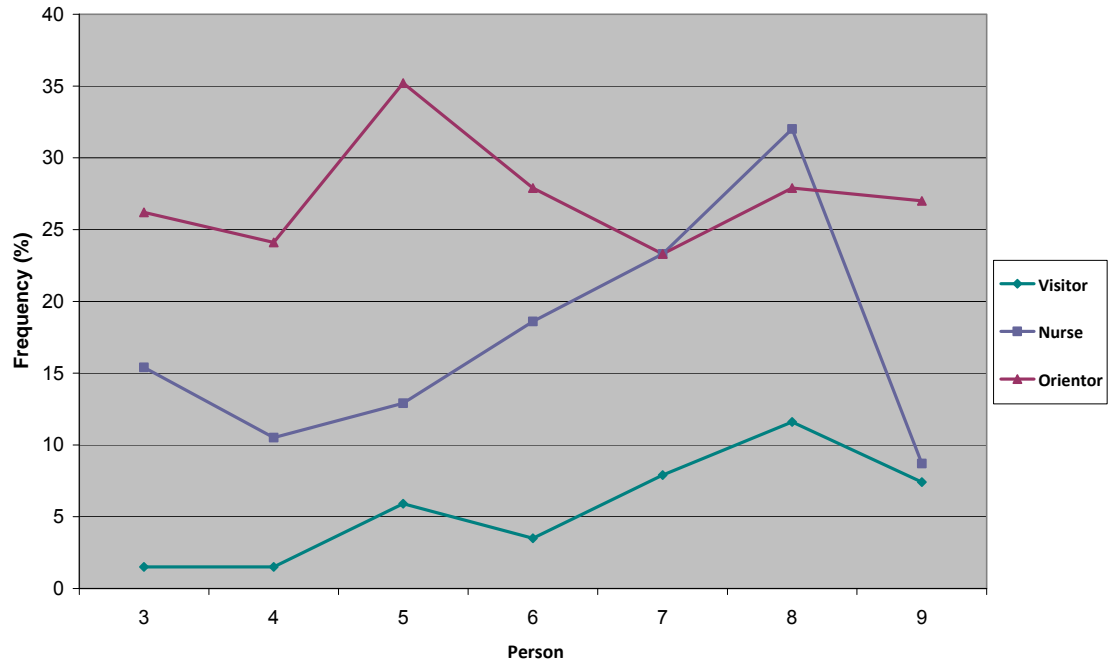
Figure 25 Weekly frequency(%) of who the GN interacted with

b) Time

Table 7 shows the total and average amount of time the GN spent interacting with each person, over 23 hours of data collection. (Note: the Total time used to determine the percentages was the time spent collecting data (22:55:40) minus the time spent In Transit (2:22:46). However, the individual times do not add up to 20:32:54 because there were occasions when the GN interacted with more than person at a time). The percentage of total time (over 23 hours of data collection) spent with each person shows a similar distribution as the frequency(%) analysis. The one significant difference is that, when analyzed by time, 44% of the GN interactions were with the patient, compared to 16% when analyzed by frequency(%). This can be attributed to the fact that the average amount of time spent with the patient was approximately three times greater (1:54m) than with staff (42s). During an average 8

hr shift, 2 hours were spent with the Orientor, approximately 1 hr was spent with

nurses, and only 6 minutes were spent with a doctor (see figure 26).

Table 7 Total time (over 23 hours of data collection), average time, and average time per 8 hr shift the GN spent with each person

Person	Total Time	%	Avg Time	Avg Time/8hr
No one	6:02:57	29%	0:51	2:05:00
Patient	9:08:31	44%	1:54	3:05:35
Visitor	2:27:23	12%	1:56	0:52:50
Nurse	2:13:54	11%	0:38	0:51:00
Doctor	0:19:24	2%	0:47	0:06:25
AH	1:17:08	6%	0:42	0:24:30
Orientor	5:54:51	29%	0:59	2:02:10
NNG	0:08:45	1%	0:24	0:04:25
Total	**20:32:54**	100%		
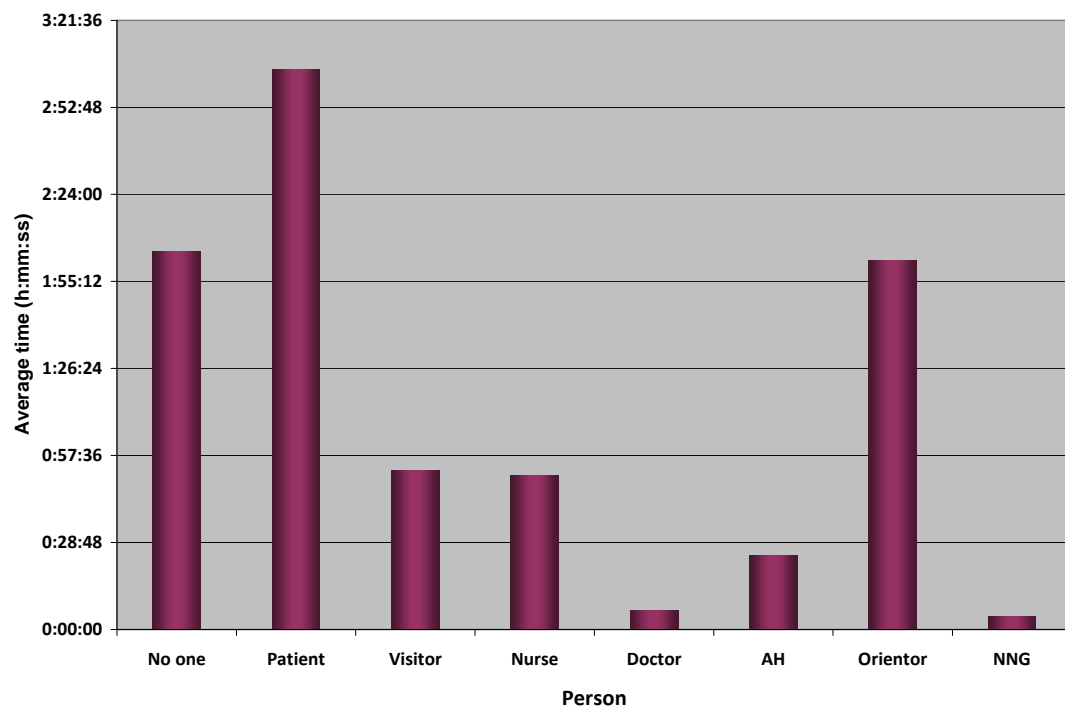
Figure 26 Average time during an 8-hr shift GN spent with each person

When the average time data was analyzed by week, the only pattern of change over time was for the GN interaction with the Orientor (see figure 27). Even though the frequency (%) of interactions with the Orientor was similar in Week 3 (26.2%) to Week 9 (27%), the average time of a single interaction with the Orientor in Week 3 (1.26s) decreased by 54% to an average of 40s per interaction in Week 9. During Week 7, when the average time began to decrease, the Orientor told the researcher that the GN was "getting a lot more independent."
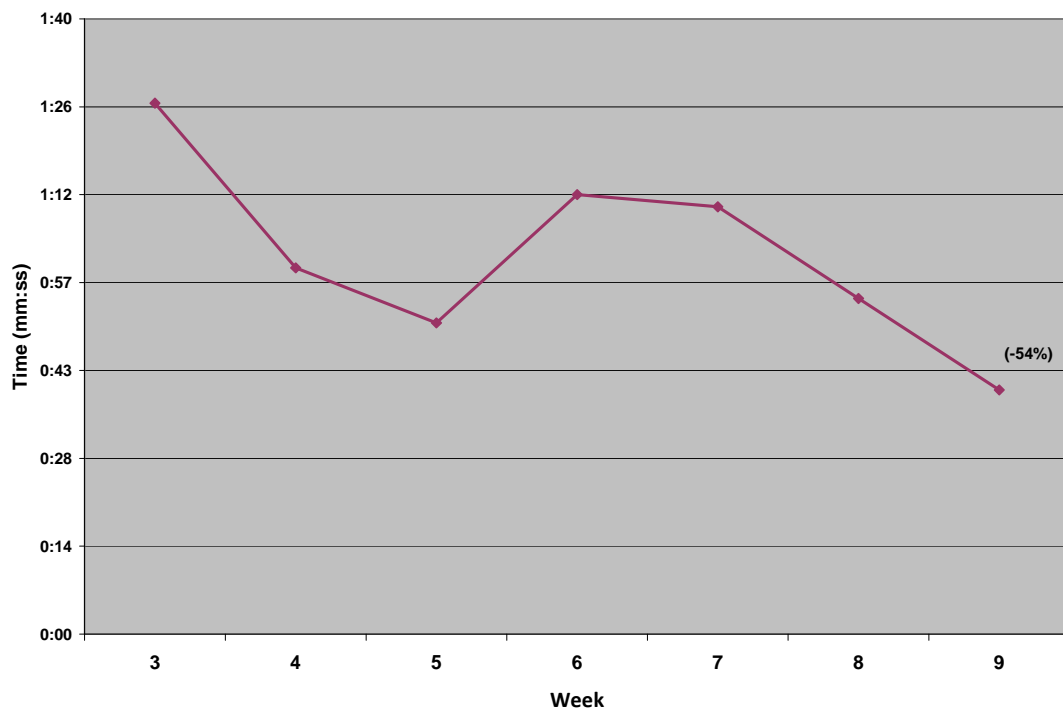
Figure 27 Average time per single interaction with Orientor, by Week

3.3.3 Analysis by Location

a) Frequency

Table 8 shows the percent and frequency of where the GN interacted over the entire seven weeks of data collection, and the average frequency during an 8-hr shift.

During an average 8 hr shift, the GN interacted 78 times in both the med room and

corridor, and 152 times in the nursing station (see figure 28). As figure 29 illustrates,

33.7% of interactions occurred in the nursing station, 17.7% occurred in the corridor,

and 17.6% occurred in the med room. According to the data, the GN only interacted

in the break room 4 times (.3 %) over seven weeks. This accurately reflects the fact

that, while the GN was working, she rarely entered the break room. However, this

does not accurately reflect the frequency of interactions that occurred in the break

room during a shift. Rather, these data reflect the decision to stop shadowing when

the GN went on break. This decision was made out of respect for the GN and staff's

need to have a break from both the Unit and from shadowing. Observation, field notes

and interviews revealed, however, that the break room was usually used once every

shift by the GN for a lunch break, and at the end of every shift to meet with the

Orientor.

When the frequency(%) data was analyzed by week, there were no distinct

patterns of change over time.

Table 8 Overall percent, frequency, and frequency/8hr shift of where the GN interacted

Location	Percent (%)	Frequency	Frequency/8hr
Backstage	2.9	37	13.38
Med room	17.6	226	78.38
Charge Desk	6.2	80	31.59
Corridor	17.7	228	78.21
Nurses Station	33.7	434	152.73
Break room	0.3	4	1.51
Patient room	21.6	278	104.88
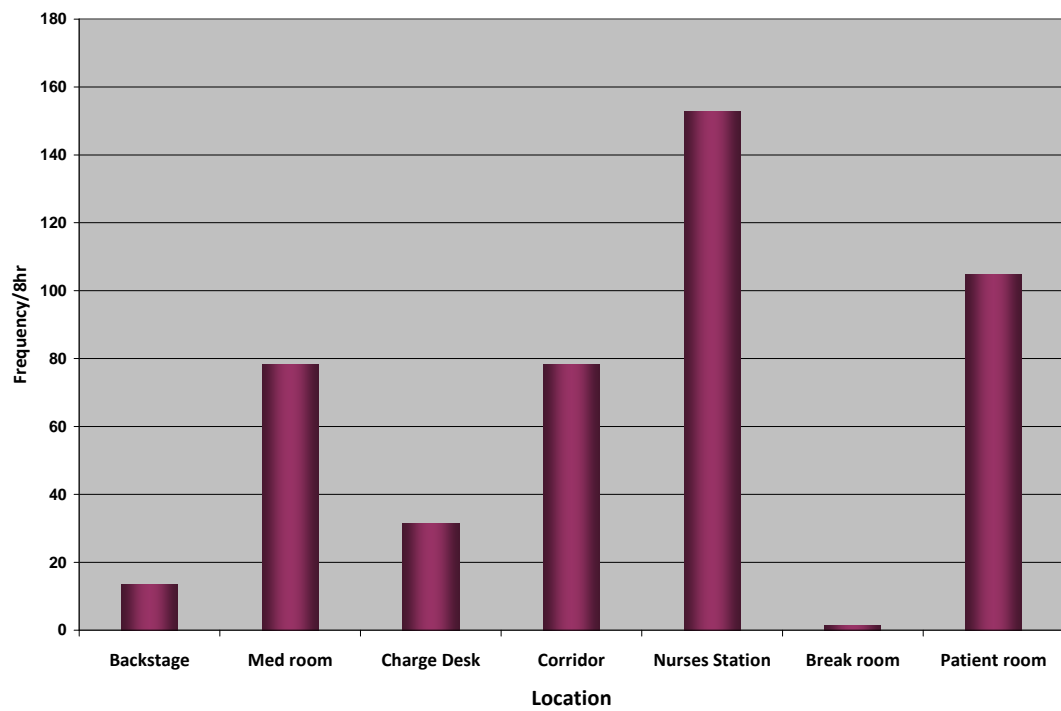
Figure 28 Frequency/8hr shift of where the GN interacted
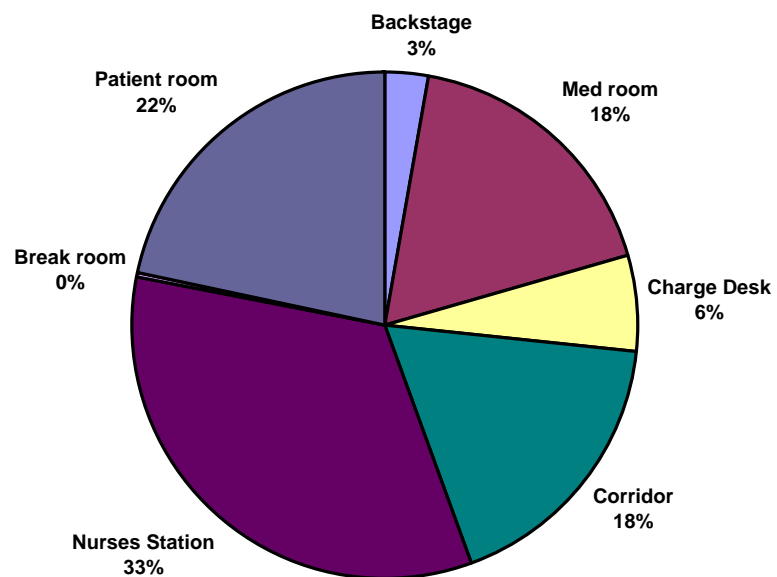
Figure 29 Overall frequency(%) of where the GN interacted (over 7 weeks of data collection)

b) Time

Table 9 shows the total and average amount of time the GN spent interacting in each location, over 23 hours of data collection, and the average amount of time during an 8hr shift. (Note: the Total time used to determine the percentages was the time spent collecting data (22:55:40) minus the time spent In Transit (2:22:46)). The average time spent interacting in the break room was excluded due to inaccuracy (as explained in the *Frequency* section). The percentage of total time (over 23 hours of data collection) spent in each location shows a similar distribution as the frequency(%) analysis. However, the amount of time spent in both the Med Room (11%) and the Corridor (8%) were significantly lower than the frequencies (17.6, 17.7%). This is because, on average, the GN had brief interactions in these locations (37s in the Med Room, and 26s in the corridor) (see figure 30). On average during an 8 hr shift, the GN spent 2 hrs in the Nursing Station, and over 3 hrs in the Patient Room.

When the time data was analyzed by week, there were no distinct patterns of change over time.

Table 9 Total time, average time, and average time per 8hr shift the GN spent interacting in each location

Location	Total Time	%	Avg Time	Avg Time/8 hr
Backstage	0:23:52	2%	0:39	0:08:40
Med Room	2:19:39	11%	0:37	0:48:20
Charge Desk	1:01:06	5%	0:46	0:24:10
Corridor	1:37:09	8%	0:26	0:33:50
Nurses Station	5:58:53	29%	0:50	2:07:10
Patient Room	9:05:11	44%	1:58	3:26:10
Total	**20:25:50**	100%		
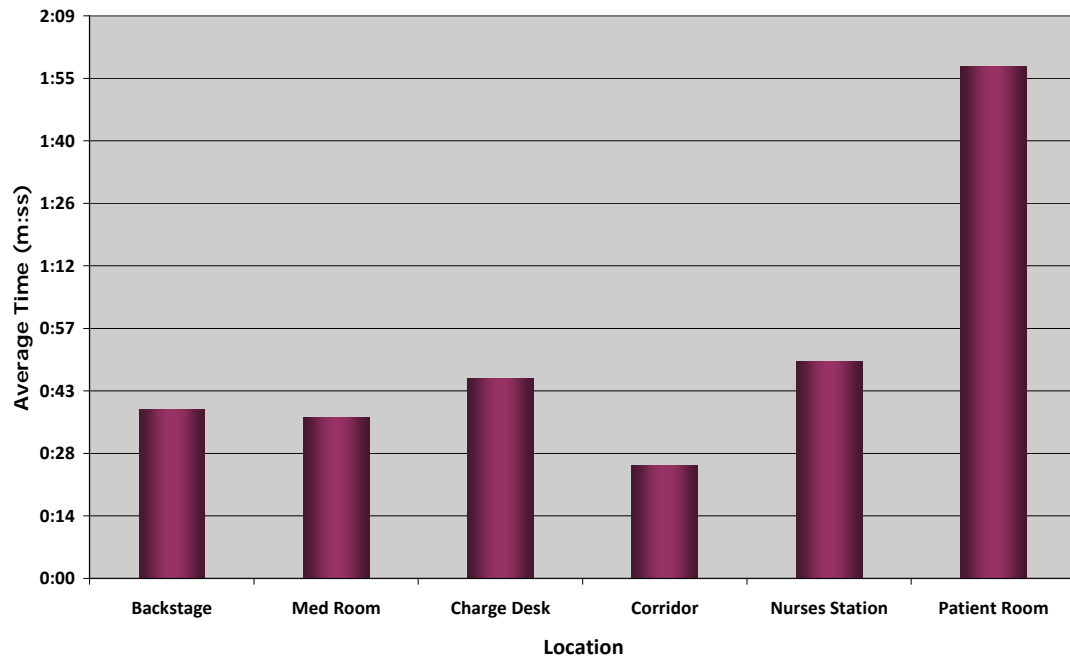
Figure 30 Average time of a single interaction by location

3.3.4 Analysis of Task, Person and Location

After analyzing the data separately by Task, Person and Location, the *frequency(%)* data was cross-tabulated to determine a) task by location, b) task by person, and c) location by person.

a) Task by Location

Table 10 shows the frequency(%) of tasks by location. The patient room and backstage are not shown because the researcher did not follow the GN into these locations. The patient room was not entered to abide by HIPPA regulations and preserve patient privacy. The backstage areas (kitchen, utility rooms, locker room) were not entered due to lack of space for the researcher to shadow. The break room is not shown due to inaccurate data (as explained previously).

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Table 10 Task frequency(%) by location

Task	Location			
	Med room	Charge Desk	Corridor	Nurses Station
Non Int	29.9	6.8	11.5	43.1
Social	20.8	7.4	25.5	45.6
Admin	10.3	10.3	20.7	55.2
Taught	25.0	17.5	15.0	42.5
Seek Assist	7.1	0.0	60.7	28.6
Patient Care	12.6	9.4	35.6	42.4
Validate	27.6	14.5	15.8	39.5
Provide Assist	5.4	2.7	51.4	40.5
Provide Adv	8.7	0.0	47.8	43.5

As the CWM data illustrates, the nursing station was both a hub of activity and a space for non-interactive work. Only in the corridor did certain interactions occur more frequently than in the nursing station – Seeking assistance (60.7%), Providing Assistance (51.4%), and Providing Advice (47.8%). Importantly, these activities all relate to informal learning. While 45% of all Social interaction occurred in the nursing station, the corridors also provided an important site for socialization (25%). The med room was the site for 20.8% of the GN social interaction, 25% of Being Taught, 27.6% of Validation *and* was also the site for one third of the GN non-interactive work (e.g., charting, meds recording).

However, the CWM data misses a crucial distinction between how the open med room was used versus how the two corner med carts were used. Observation and focused interviews revealed that the open med room was used to store narcotics and was the primary site for non-interactive work; while the med carts were used to store milder, patient specific medications and were sites for social interaction, validation, learning and discussing patient care. Even though the med room was open, the Unit had established an unspoken agreement that when someone was in the med room you left them alone, in effect defining an invisible boundary (see figure 31). According to

an interviewee, "We just do it subconsciously, without even thinking about it." The boundary was further reinforced by the layout of the med room, which requires the staff member to turn their back to the unit in order to access the Pyxis medication dispenser. In contrast, the med carts provided a space for informal communication, a "moment when everyone is together…and if you have something on your mind you can say it because somebody is right there." In addition, according to the Orientor, the med carts served as an important area for teaching as the GN had to go to the med cart for every patient's medications. Unlike the med room layout, when a staff member stood at a med cart they had their backs turned to the patient rooms but faced in towards the nursing unit, therefore encouraging interaction.
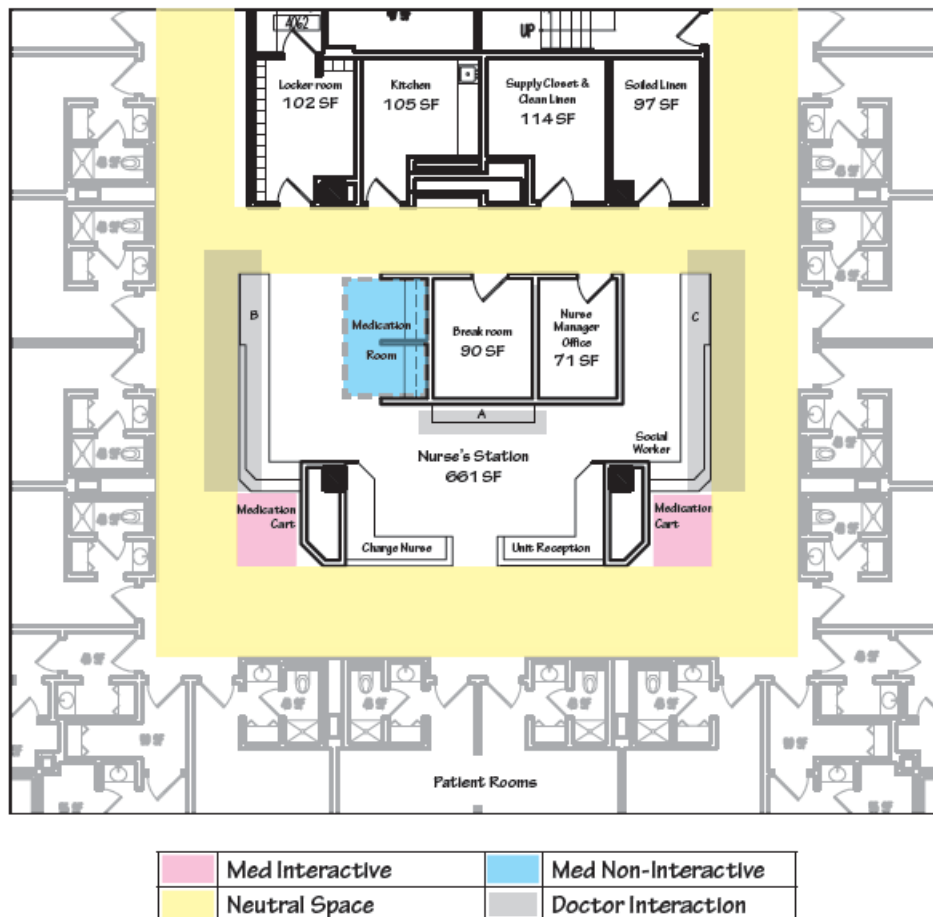
Figure 31 Nursing Unit Floor plan showing activity zones

While the med cart areas provided a welcome space for informal communication, the placement of the two med carts hindered teamwork within the Unit by physically dividing the Unit into two halves or two teams (see figure 32). Each med cart served its respective side of the unit, and contained patient-specific medications. Therefore, the nurses rarely had a need to cross over to the other side of the unit such that "sometimes I don't even know who's working over there for half of a day." The separation of the Unit into two teams was exacerbated by the placement of two large columns (see figure 32), one by each corner med cart, which obstructed visibility across the Unit. Therefore, not only did the nurses rarely cross paths, but they often didn't even see each other.
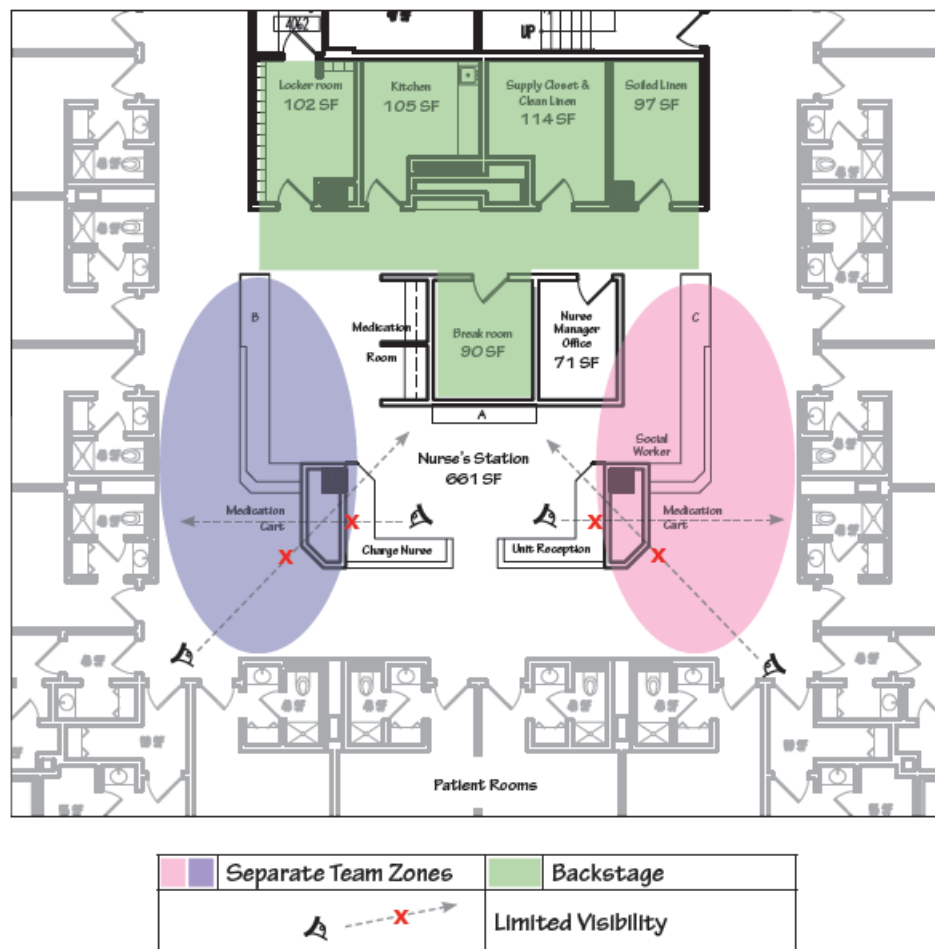
Figure 32 Nursing Unit floor plan showing Unit division

By not recording the interactions that occurred backstage, the CWM data fails to show that the backstage locations were often the *one* place where the nurses did cross paths (see figure 32), providing a unique opportunity to realize who else is working on the unit, exchange information and advice, and provide social support. In particular are the clean and dirty utility rooms, and the corridor spaces directly outside. Not only did these spaces contain supplies needed by all nurses, they were often the only available, private spaces on the Unit. As one interviewee described it:

> "When we go in and grab an IV bag…you'll see somebody from that side and they'll be like 'how's your day' and you'll be like 'oh man! This, this and this' and then you'll be like 'well how's your day?' and then its 'this, this and this,' and that's how you cross your path…in the Med Room or at the Med Carts you don't really share, I mean you ask for advice more that you say how your day is."

Similar to the backstage areas, the break room also served as a crucial space for social support and unification of the Unit. Because the break room was physically located within the Unit, the nurses felt close enough to their patients in case something went wrong, while providing a much-needed location where nurses feel comfortable socializing and venting. As one interviewee described it, "we leave but we don't leave." Figure 33 shows the distinction between backstage areas, that were crucial for facilitating social support and unification of the Unit, versus frontstage areas, where the interactions focused more on validation, discussing patient care and seeking assistance.
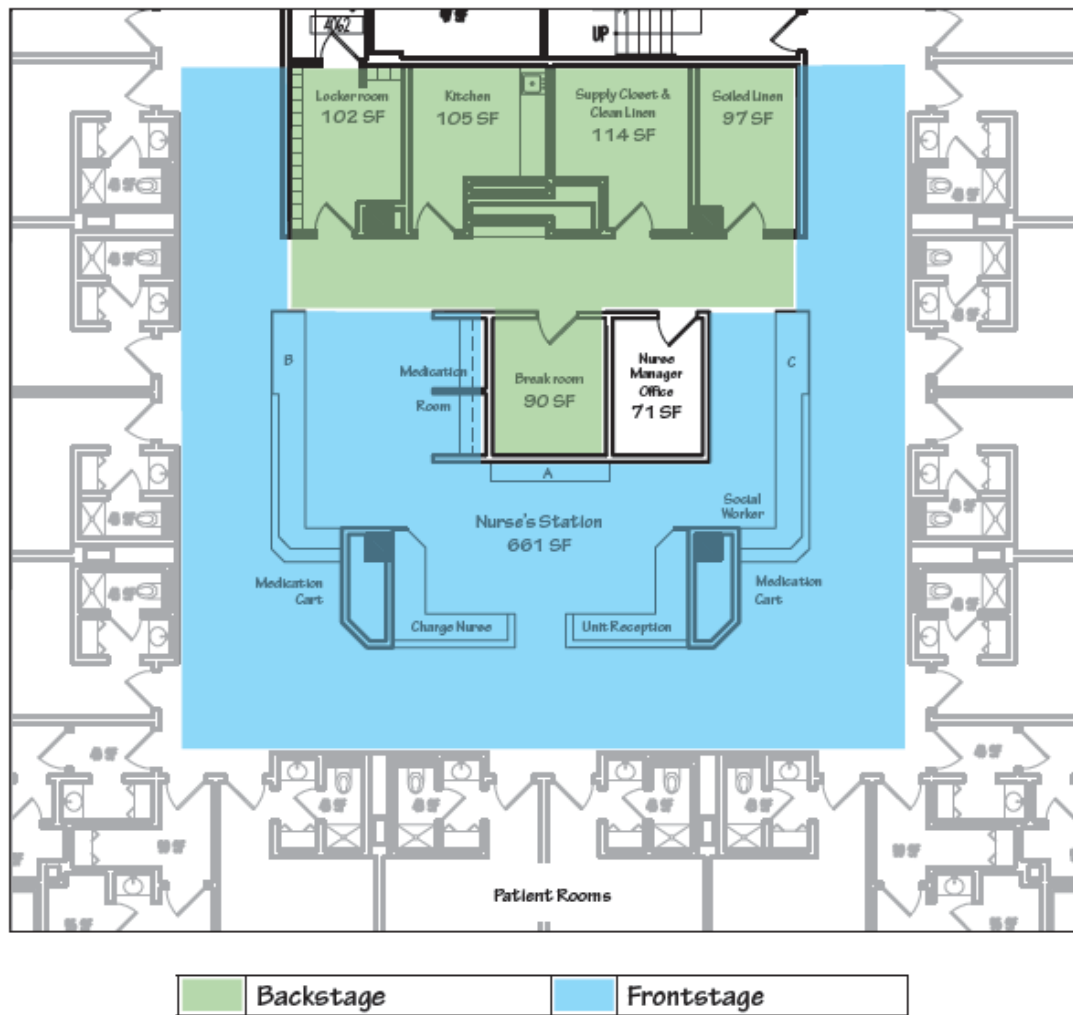
Figure 33 Nursing Unit floor plan showing Backstage/Frontstage areas

Table 11 shows the frequency(%) of task by location when the communication tasks are grouped as "Procedural" (admin, seeking assistance, providing assistance) and "Knowledge Transfer" (Being Taught, Discussing Patient Care, Validation, Providing Advice). As figure 34 shows, nearly half (42.5%) of the Knowledge Transfer interactions occurred in the nursing station, 28.6% in the corridor, and 17.7% in the med room (primarily at med carts, as described previously).

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Table 11 Frequency(%) of tasks by location, with tasks grouped to emphasize Knowledge Transfer

Task	Location			
	Med room	Charge Desk	Corridor	Nurses Station
Non Int	29.9	6.8	11.5	43.1
Int Social	20.8	7.4	25.5	45.6
Procedural	7.4	4.3	44.7	41.5
Knowledge Transfer	17.7	10.6	28.6	42.5
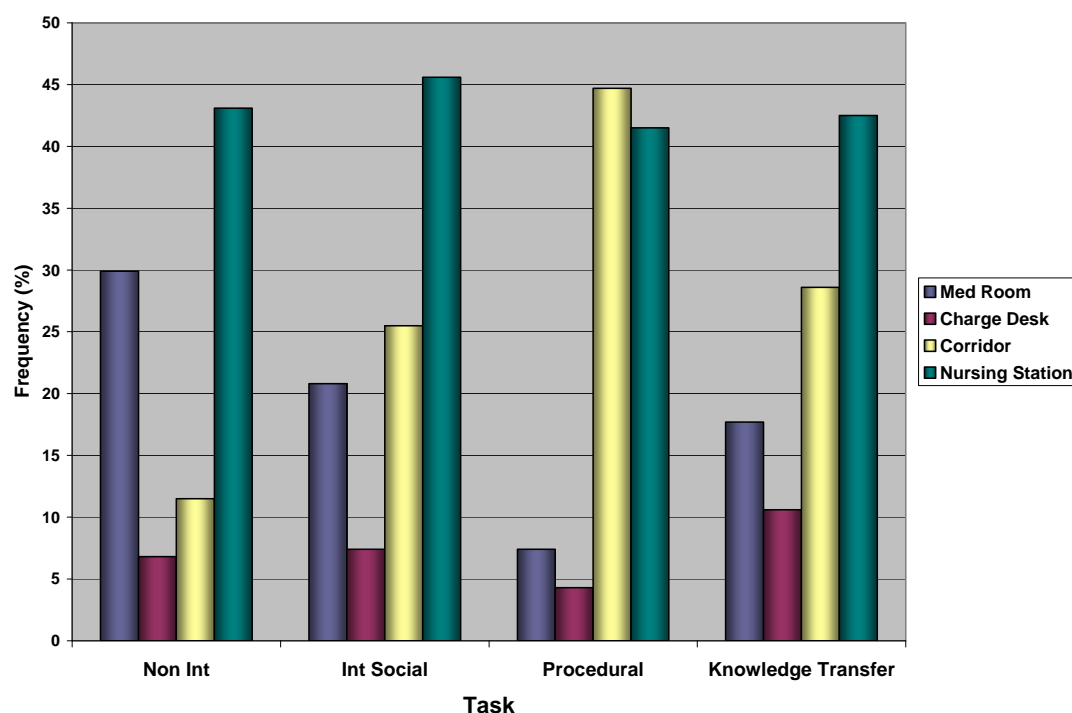
Figure 34 Frequency(%) of tasks by location, with tasks grouped to emphasize Knowledge Transfer

b) Task by Person

Table 12 shows the frequency(%) of task by person. The CWM data shows that the majority of the GN interactions were with the Orientor, and that no more than 10% were with a doctor. Of particular note is that 96.1% of Validation and 90% of Being Taught were with the Orientor. By using the nurse category to record GN interactions with both registered nurses and nursing students, the difference between

these interactions was not captured. Observation showed that, while the GN would

Discuss Patient Care and Socialize with the registered nurses, the GN rarely Provided

Advice. However, the GN would Provide Advice to the nursing students, but would

rarely Socialize. The Allied Health category was primarily used to record the GN

interactions with nursing aides, and therefore provides a relatively accurate reflection

of this important relationship. Not only did the nursing aides play an important role in

Administrative tasks (37.9%) and Assistance (21.4%), they also provided Social

support (14.8%) and Discussed Patient Care (20.4%).

Table 13 shows the frequency of task by person when the communication tasks

are grouped as Procedural (Admin, Seeking Assistance, Providing Assistance) and

Knowledge Transfer (Being Taught, Discussing Patient Care, Validation, Providing

Advice). As figure 35 shows, two thirds (63.4%) of the Knowledge Transfer occurred

between the GN and Orientor, 25.4% with nurses, and 12.1% with allied health

(primarily nursing aides).

Table 12 Frequency(%) of task by person

	Person					
Task	Visitor	Nurse	Doctor	AH	Orientor	NNG
Patient Int	47.7	16.7	0.8	12.9	47.7	3.8
Non Int	0.0	0.0	0.0	0.0	0.0	0.0
Social	2.7	51.7	7.4	14.8	39.6	2.7
Admin	3.4	27.6	10.3	37.9	24.1	0.0
Taught	0.0	7.5	5.0	5.0	90.0	0.0
Seek Assist	3.6	25.0	3.6	21.4	46.4	3.6
Patient Care	1.6	31.9	0.5	20.4	50.8	4.2
Validate	0.0	1.3	2.6	0.0	96.1	0.0
Provide Assist	8.1	37.8	10.8	32.4	10.8	5.4
Provide Adv	0.0	91.3	0.0	0.0	0.0	8.7

Table 13 Frequency(%) of task by person, grouped to emphasize Knowledge Transfer

Task	Person				
	Nurse	Doctor	AH	Orientor	NNG
Patient	7.8	0.4	6	22.8	1.8
Int Social	51.7	7.4	14.8	39.6	2.7
Procedural	30.9	8.5	30.9	25.5	3.2
Knowledge Transfer	25.4	1.5	12.1	63.4	2.9
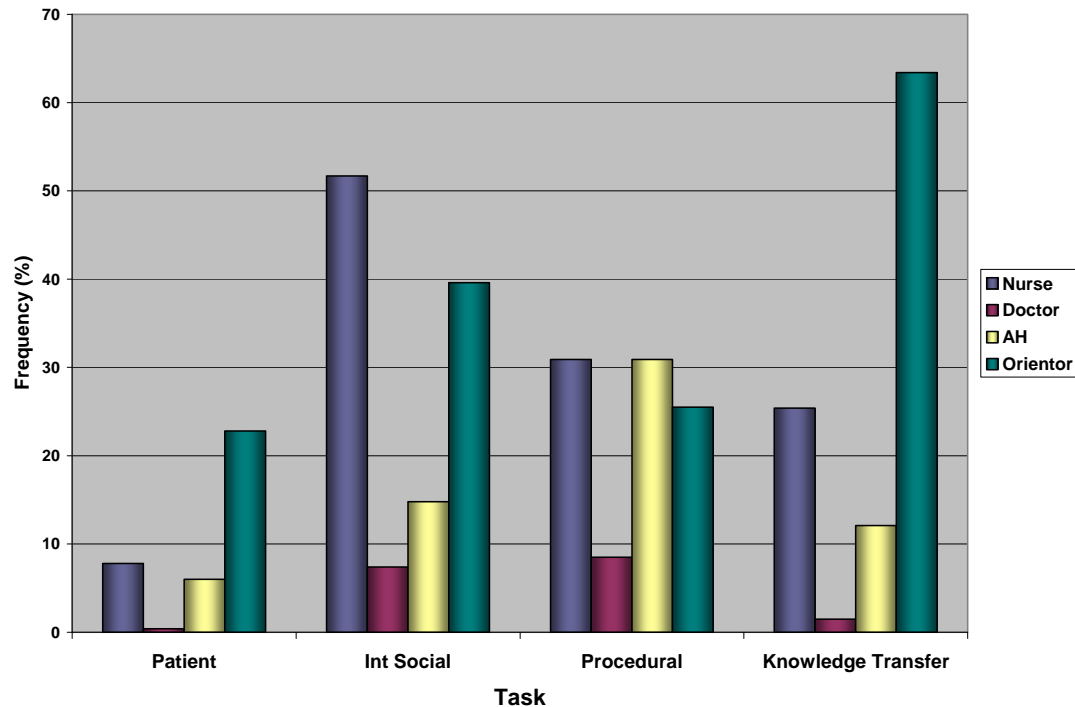
Figure 35 Frequency(%) of task by person, with tasks grouped to emphasize Knowledge Transfer

c) Location by Person

Table 14 and figure 36 show the overall frequency(%) of location by person interactions. The CWM data shows that when the GN was interacting at a med cart, one third of the interactions were with the Orientor (29.6%), 11.5% were with nurses, and only 4.4% were with allied health (or nurses aides) and 0% were with a doctor. When the GN was interacting in the corridor, one third of the interactions were with the Orientor (29.8%), one quarter were with nurses (24.1%) and 20.6% were with

allied health. Observations showed that, when the GN Provided Advice to nursing students, the interaction occurred in the corridor. In addition, when the GN Discussed Patient Care with nursing aides, it also occurred in the corridor. As Table 15 and figure 37 illustrates, the majority of interactions between the GN and allied health (nursing aides) occurred in the corridor (43.1%). Figure 28 illustrates the neutral corridor zone where these cross-discipline interactions occurred. By contrast, the majority of interactions between the GN and Nurses (39.7%) and the Orientor (37.6%) occurred in the Nursing Station.

Table 14 Frequency(%) of location by person

Location	No one	Patient	Visitor	Nurse	Doctor	AH	Orientor	NNG
				Person				
Med room	56.2	0.4	0	11.5	0	4.4	29.6	1.8
Charge Desk	36.3	1.3	0	30.0	0	3.8	30.0	1.3
Corridor	21.5	2.6	3.5	24.1	0.9	20.6	29.8	3.1
Nurses Station	42.2	0.5	0.9	19.6	5.1	7.1	31.3	1.2
Patient room	0	100	23.0	7.9	0.4	6.1	22.7	1.8
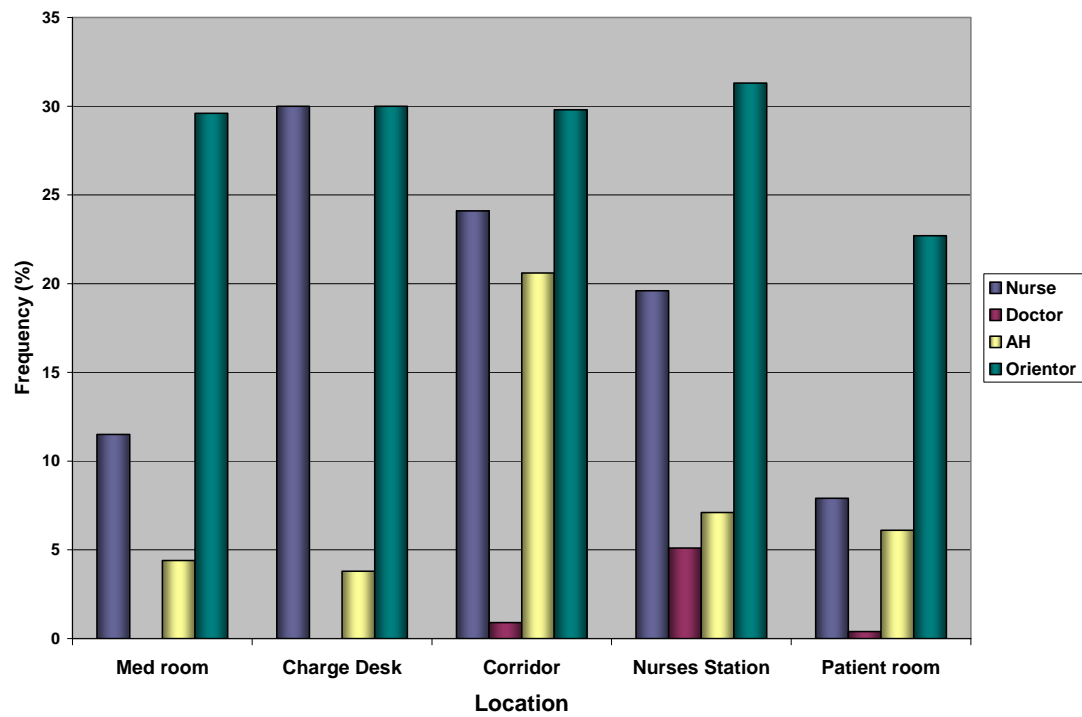
Figure 36 Frequency(%) of location by person

Table 15 Frequency(%) of person by location

Person	Transit	Med room	Charge Desk	Corridor	Nurses Station	Patient room
No one	55.4	13.3	3.0	5.1	19.2	0.0
Visitor	0.0	0.0	0.0	10.5	5.3	84.2
Nurse	0.0	12.1	11.2	25.7	39.7	10.3
Doctor	0.0	0.0	0.0	8.0	88.0	4.0
AH	0.0	9.2	2.8	43.1	28.4	15.6
Orientor	0.3	18.5	6.6	18.8	37.6	17.4
NNG	0.0	1.8	1.3	3.1	1.2	1.8
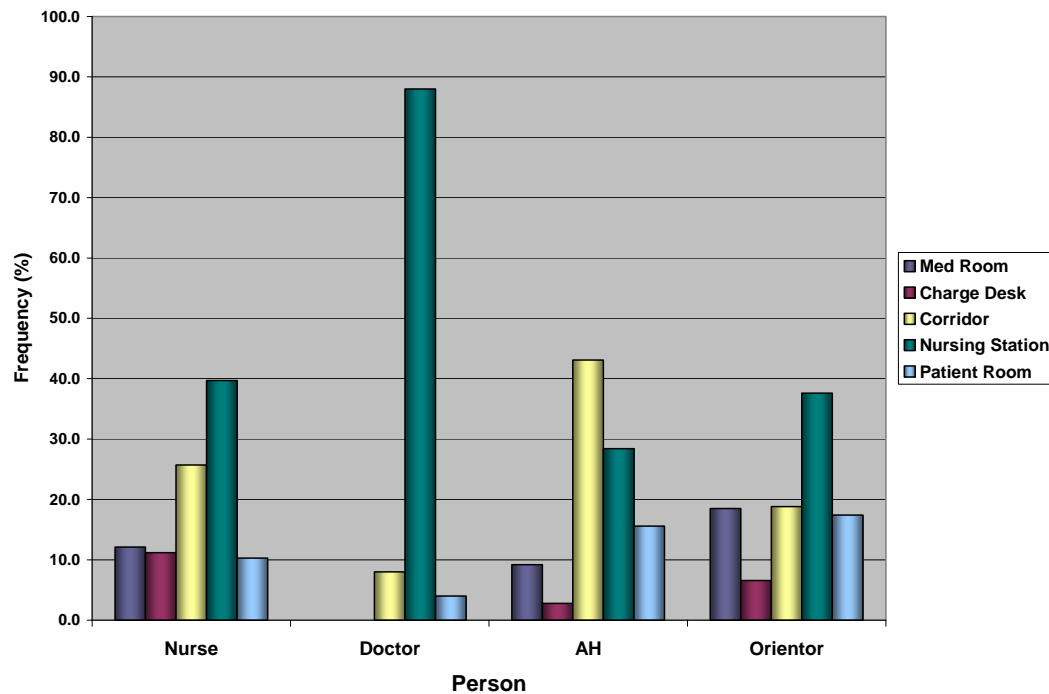
Figure 37 Frequency(%) of person by location

The CWM data in Table 15 shows that 88% of interactions between the GN and doctors occurred in the nursing unit. However, observations and focused interviews revealed that these interactions usually occurred around the *outside* edge of the nursing unit (see figure 28), where the doctor would chart after visiting a patient. According to an interviewee, "you'll find us interacting more with doctors on the outskirts…you kind of catch them on the side…if I have a concern I will go up to him [in the corridor]." If the interaction did occur *inside* the nursing unit it was usually at Desk A (see figure 31) which, although not formally designated for doctors, was known among the nurses as the doctors' work area.

3.3.5 Summary of Findings: Interaction and Communication

Analysis of the Communication and Interaction patterns of the GN can be summarized as follows:

- GN communication was: 33.3% Discussing Patient Care, 26% Social, and 13.3% Validation. Discussing Patient Care (34s) and Social Interaction (25s) had the shortest average interaction times, while Being Taught (56s) and Validation (51s) had the longest. Four communication categories showed a pattern of change over time: Social interaction increased by 75%, Discussing Patient Care increased by 65%, Being Taught decreased by 95%, and Validation decreased by 75%.

- During an average 8-hr shift, the GN interacted 124 times with the Orientor, 80 times with nurses, 97 times with patients, and 8 times with a doctor. On average, the GN spent 2 hrs with the Orientor, 1 hr with nurses, and 6 minutes with a doctor. While the percentage of interaction with the Orientor was similar in Week 3 to Week 9, the average length of an interaction decreased by 54% from 1.26s to 40s.

- During an average 8-hr shift, the GN interacted 78 times in med areas and the corridor, and 152 times in the nursing station. The average duration of interactions in the med areas (37s) and Corridor (26s) were brief compared to other locations.

- Observation and focused interviews revealed distinct activity zones. In particular, the med room as a site for non-interactive work versus the med carts as sites for Social interaction, Validation, learning, and Discussing Patient Care. The back stage areas, break room were shown to facilitate social support and unification of the Unit. The corridors were neutral zones facilitating cross-disciplinary interactions.

- Knowledge Transfer mostly occurred in the nurses station, corridor, and med carts, and was mostly with the Orientor, nurses, and nursing aides. Only 1.5% of Knowledge Transfer interactions occurred with a Doctor.

- The relationship between the GN and nursing aides was shown to be important for learning, social support and providing assistance, and these interactions usually occurred in the corridor.
- The GN and doctor usually interacted on the outside edges of the nursing station, within the corridor neutral zone.

3.4 Learning & Gaining Competency

Through observation and focused interviews, qualitative data was collected on the Unit's approach to GN Orientation. A survey was used to assess the degree to which the Unit supported and encouraged learning, from the perspective of both the GN and registered nurses. A Competency Rating Tool was used to collect weekly quantitative data on how the GN competency changed over the 12-Week orientation period. The Competency Rating data was complemented by the quantitative weekly evaluations filled out by the Orientor.

3.4.1 Unit Approach to Orientation & Support for Learning

The GN had a one-on-one relationship with the Orientor until Week 4, at which point a second GN began Orientation. However, the second GN worked an afternoon shift, and therefore the GN being shadowed was able to maintain the close relationship with the Orientor. During Orientation, the Orientor did not have patient assignments, but rather shared patients with the GN. In order for the teaching to remain consistent over the course of Orientation, the GN was encouraged to approach the Orientor first with questions. While the GN was free to ask any staff member for advice and verification, the GN sought out the Orientor over 90% of the time (see section 3.3.4: Task by Person).

The Orientor's approach to learning was to always encourage questioning, and to guide the GN to where the appropriate information could be found. For example, rather than simply provide the answer, the Orientor would say "that's a good question for pharmacy" or "why don't you call dietary."

Staff (n=12) ratings from the learning section of the survey (see Appendix F for complete survey) showed the Unit to be supportive of learning, with no average score below 5, and an overall mean score of 6.0 out of 7.0. The inter-item reliability of the learning section was calculated after the survey had been administered using Cronbach's Alpha, and found to be acceptable (n=22; α=9.0). The highest mean rating was for the statement "Nurses on my unit are given opportunities to take on challenging tasks (X^2=6.42)." The lowest mean rating was for the statement "Other nurses on my unit ask me what I feel I need to learn to do my job more effectively (5.1)." The GN mean ratings from the learning section of the survey decreased slightly from T1 to T2 (T1 X^2=5.82; T2 X^2=5.76), and the overall mean was 5.79 – slightly lower than the staff rating. Comparing staff to GN ratings (see figure 38), they were similar except for 2 questions that the GN rated lower by at least one point: "I frequently collaborate with nurses on my unit to come up with mutually acceptable decisions (GN=5 and Staff=6.3)" and "I exchange information/ideas frequently with nurses through face-to-face communication (GN=5 and Staff=6.5)."
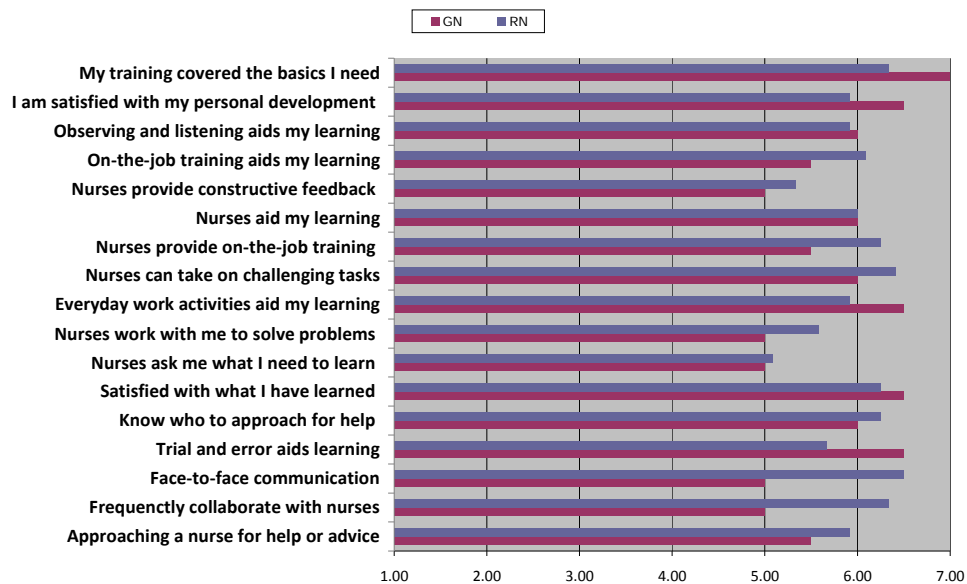
Figure 38 Mean registered nurse(RN) & GN learning survey responses

3.4.2 Weekly Competency Ratings

GN competency levels were rated by the Orientor from Week 1 through Week 9 (see Appendix G for Competency Rating form). The mean rating went from 2.67 to 6.89, an increase of 158%, putting the GN just below the "Proficient" level by the end of Week 9 (see figure 39). According to the Orientor's weekly evaluations, the GN met all weekly goals each week, and exhibited very good competency, relative to what was expected of a new nurse. The GN mean competency ratings increased from Week 1 to 4, plateaued until Week 5, increased again in Week 6, and then plateaued through Week 9. There were multiple events that coincided with the plateau during Week 5, and subsequent increase in competency in Week 6. Week 5 was when the GN patient census increased from 3 to 4, and when the GN began administering chemotherapy. During Week 6 the GN started to become more confident with chemotherapy

procedures. As discussed in section 3.3.1, Week 6 was when the frequency of

Validation and Being Taught interactions began to decrease, and Discussing Patient

Care and Social interactions increased (see figure 40). Week 5 and 6 was also when

the GN began Providing Advice to the nursing students.
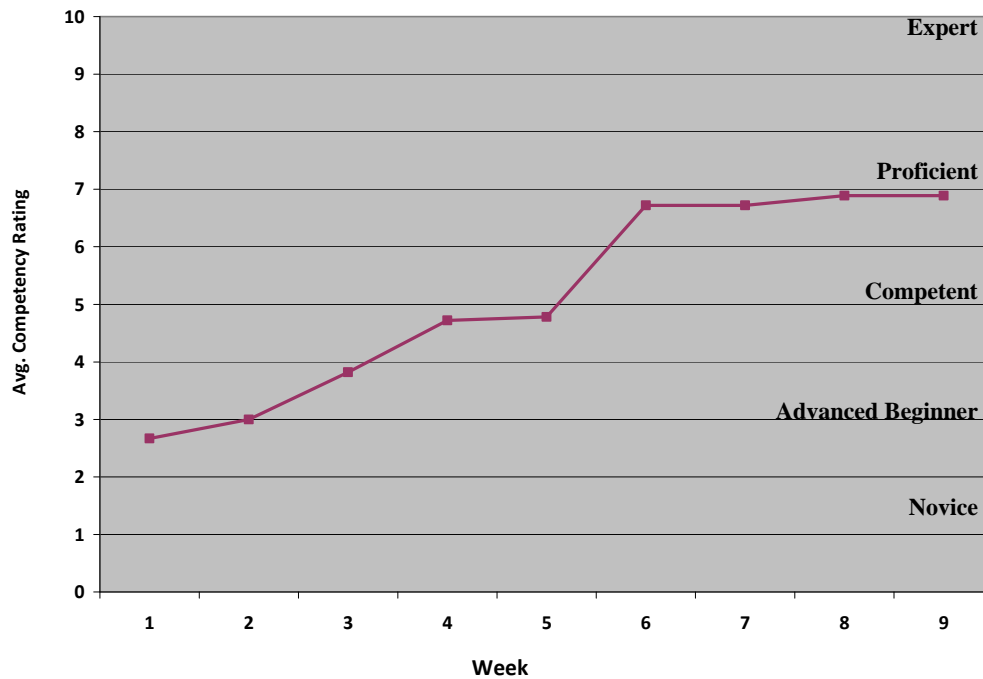
Figure 39 Average competency ratings by week
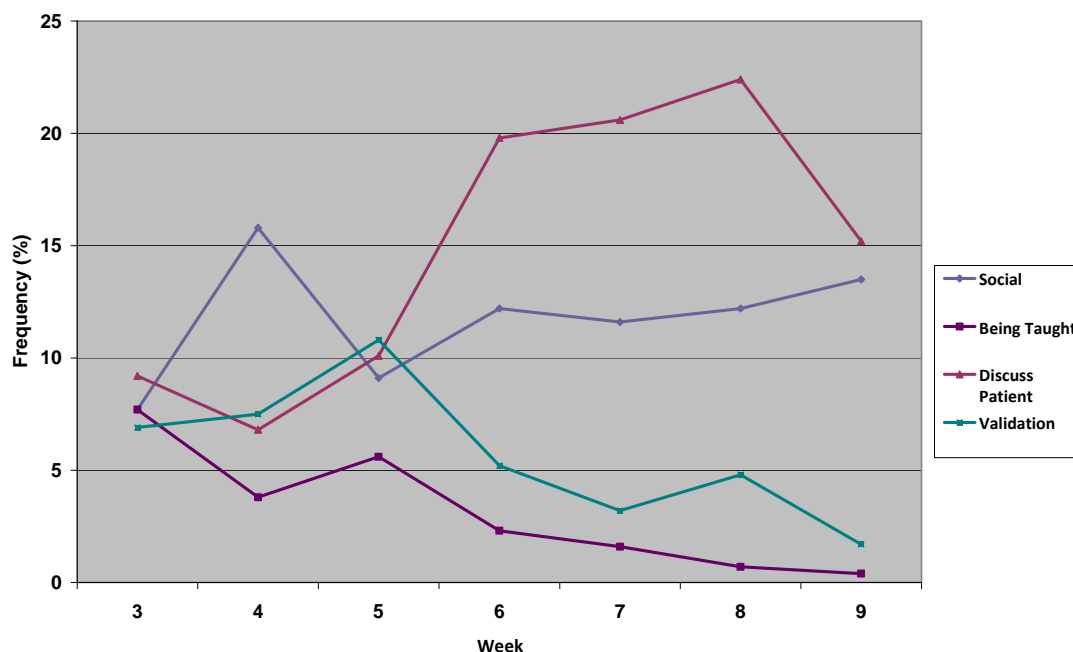
Figure 40 Frequency(%) of communication tasks by Week

Figure 41 shows the competency ratings at the end of Week 9. The Competency categories with the lowest ratings were Rounds (3); Handoff, Medications, Time Management, Critical Thinking, Delegation and Patient Care Plan (6). The Competency category that increased most significantly by Week 9 was Independence (increase from 1 to 7). According to the Orientor, the "GN became more and more independent on her own, looking things up on her own and looking for answers and seeking them out in other ways besides asking me." The Orientor also commented that the GN assessment skills were "excellent," and that documentation was always very thorough. When the GN experienced a coding patient for the first time during Week 8, the Orientor explained that the GN remained "calm and confident" throughout. During Week 9, the GN provided comfort care for the first time, and the Orientor commented that the GN had been "awesome with the patient's

family" and "very good with emotional support of family and patient during a very difficult time."
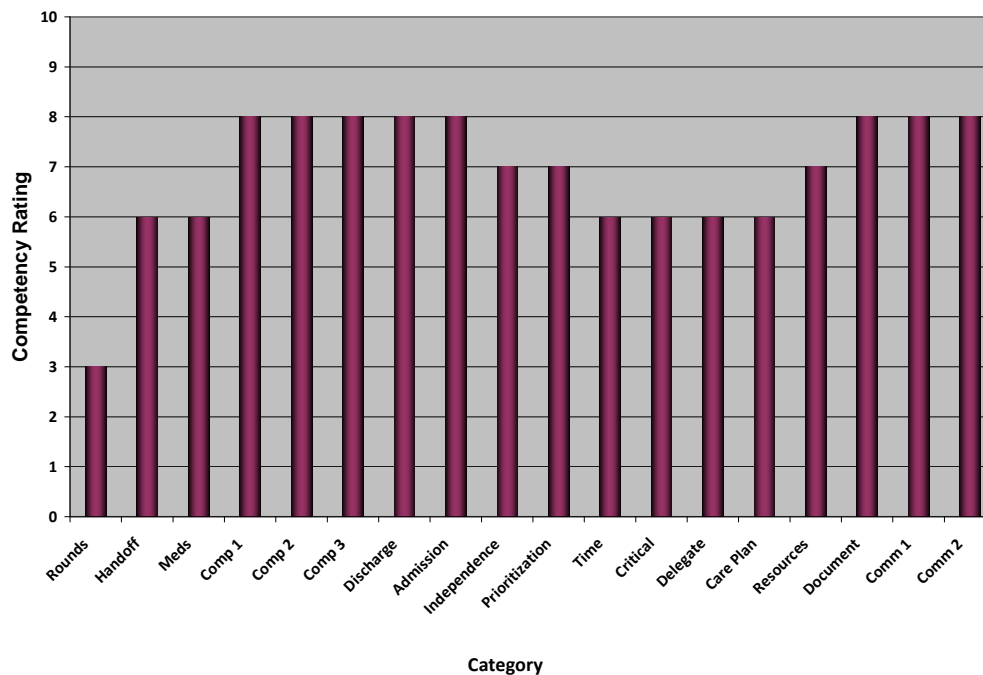
Figure 41 Week 9 competency ratings by category

According to the GN, the greatest aid to gaining competency was learning by doing, and working directly with the patients. Another crucial aid was support and encouragement from the nurses, who would notice when the GN needed to work on a skill and would find an opportunity for the GN to practice that skill. By the end of Week 9 the GN was questioning whether being familiar with the Unit at the beginning of orientation had in fact been detrimental. While there were advantages to knowing the nurses, doctors, and administrative procedures, the GN felt that the staff had higher expectations regarding ability to provide patient care. As a result, the GN felt a lot of pressure when taking the Registered Nurse Board Exams, and expressed a desire that the Unit "understand that I'm still learning." Therefore, the reason the GN did not

pass the Board Exams was more likely due to overwhelming pressure and high expectations, rather than a reflection of the GN competency[1].

3.4.3 Summary of Findings: Gaining Competency

Analysis of the nursing unit as a learning environment and the GN gaining of competency can be summarized as follows:

- Survey results showed that the Unit supported and encouraged learning, and that the GN found the Unit to be a supportive environment for gaining competency during the Orientation process.

- The GN sought out the Orientor 90% of the time for Advice and Verification. The Orientor's philosophy on learning was facilitating one-on-one time, encouraging questioning, and guiding the GN on where to find appropriate information.

- The GN competency ratings increased from Week 1 to Week 9, putting the GN just below the Proficiency level by the end of Week 9. According to the Orientor, the GN demonstrated very good competency, relative to what was expected, and showed a significant increase in Independence. The GN also demonstrated excellent assessment skills, thorough documentation, calm and confidence, and the ability to provide emotional support to patients and families. Clinical Rounds were the lowest area of competency.

- According to the GN, the greatest aids to gaining competency were learning by doing, and support from staff.

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[1] The GN re-took the Board Exams three weeks later and passed.

3.5 Physiological and Perceived Stress

Both perceived and physiological stress levels of the GN were assessed over the course of orientation. Perceived stress was assessed through the stress section of the survey (see Appendix F for complete survey), and was compared with the mean stress ratings of the Unit staff. Physiological stress was assessed by taking blood pressure readings three times daily from Week 2 through Week 9. Mean weekly blood pressure readings were then compared to weekly competency ratings.

3.5.1 Perceived Stress: Survey Responses

The GN mean rating for T1 and T2 of the Stress survey was 1.51. The means for T1 and T2 decreased slightly from 1.56 to 1.47. The ratings for each question didn't change by more than 1 point from T1 to T2. When the situations were grouped by the six sub-scales used by Gray-Toft & Anderson (1981), situations relating to Inadequate Preparation had the highest mean stress rating, and situations relating to Lack of Support and Conflict with Other Nurses had the lowest mean stress ratings (see table 16).

The Staff (n=12) mean Stress rating was 2.1, a half-point higher than the GN mean rating. According to the Staff ratings, the most stressful situation was "Not enough staff to adequately cover the unit (X^2=3.25)." As figure 42 shows, both the GN and staff rated the overall stress of the Unit as "Occasional" or less, and didn't rate any situations as being "Very Frequently" stressful.

Table 16 Mean GN stress ratings, grouped by Gray-Toft & Anderson categories

I: Death & Dying	1.43
II: Conflict with Physicians	1.60
III: Inadequate Preparation	2.00
IV: Lack of Support	1.00
V: Conflict with Other Nurses	1.00
VI: Work Load	1.77
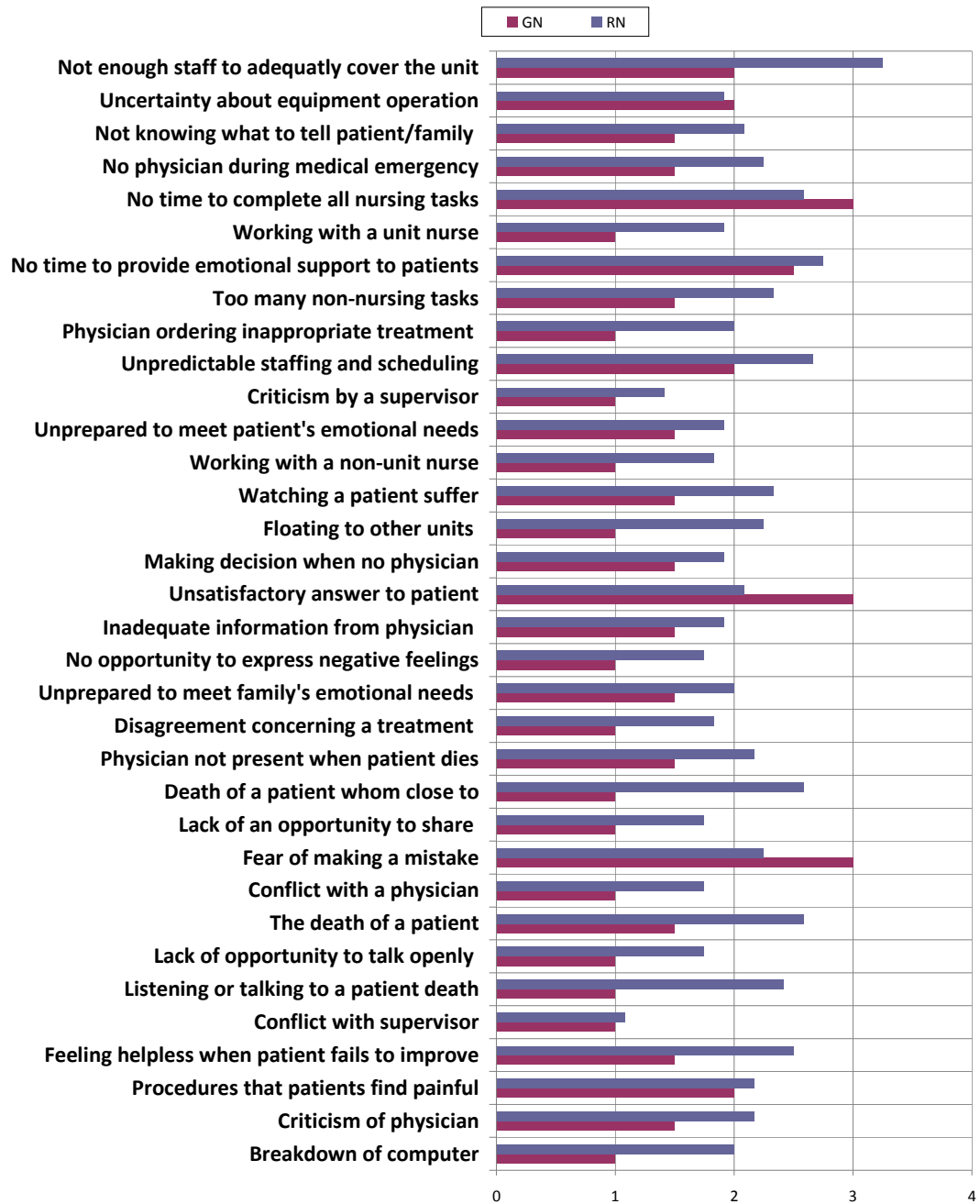
Figure 42 Mean registered nurse (RN) & GN stress survey responses

Table 17 illustrates how GN stress ratings changed from T1 to T2, showing 1) situations where the GN stress *decreased* by one point, 2) situations where GN stress *increased* by one point, and 3) situations where GN stress was reported as *frequent* (rating=3) for both T1 and T2. The situations are grouped by the six sub-scales used by Gray-Toft & Anderson (1981). There were no significant increases, decreases, or frequently stressful situations in the "Lack of Support" and "Conflict with Other Nurses" sub-scales. These sub-scales also had the lowest mean ratings. Situations within the sub-scales "Conflict with Physicians" and "Inadequate Preparation" became less stressful. However, each of these sub-scales also contained a situation that was rated by the GN as "frequently" stressful. Two of these situations were "Being asked a question by a patient for which I don't not have a satisfactory answer," and "Fear of making a mistake in treating a patient." Both of these situations refer to a lack of knowledge or competency. While certain situations within "Death and Dying" and "Work Load" became less stressful, these were also the only two sub-scales where certain situations became more stressful. The fact that the GN found situations within "Death and Dying" to become more stressful is not surprising given that the biggest reason new nurses leave the Unit is due to an inability to cope with Death and Dying, which is particularly prevalent in Oncology Units.

Table 17 Change in GN stress from T1 to T2, by 6 Gray-Toft & Anderson categories

I: Death and Dying	
a. Feeling helpless in the case of a patient who fails to improve	⬇️
b. The death of a patient	⬆️
b. Physician not being present when a patient dies	⬆️
b. Watching a patient suffer	⬆️
II: Conflict with Physicians	
a. Criticism of physician	⬇️
a. Making a decision concerning a patient when the physician is unavailable	⬇️
c. Fear of making a mistake in treating a patient	🔴
III: Inadequate Preparation	
a. Feeling inadequately prepared to help with the emotional needs of a patient's family	⬇️
a. Feeling inadequately prepared to help with the emotional needs of a patient	⬇️
c. Being asked a question by a patient for which I do not have a satisfactory answer	🔴
IV: Lack of Support	
V: Conflict with Other Nurses	
VI: Work Load	
a. Inadequate information from a physician regarding the medical condition of a patient	⬇️
a. Too many non-nursing tasks required, such as clerical work	⬇️
a. Not enough time to provide emotional support to a patient	⬇️
b. A physician not being present in a medical emergency	⬆️
b. Not knowing what a patient or a patient's family ought to be told about the patient's condition and its treatment	⬆️
c. Not enough time to complete all of my nursing tasks	🔴

⬇️	Stress decreased
⬆️	Stress increased
🔴	Frequent stress

3.5.2 Physiological Stress: Blood Pressure

The GN recorded 26 days of blood pressure (BP) readings (see Appendix E for recording sheet), over the course of 8 weeks. Given that BP was recorded three times daily, a total of 78 readings were obtained. The GN took two consecutive readings at each of the three times, which were averaged for the purpose of data analysis. When the AM, noon, and PM readings were analyzed separately they showed similar patterns over time, and were therefore averaged to give a single mean BP reading for each day. The daily averages were then combined by week to produce a mean BP reading for each week. Figure 43 shows how the mean weekly BP changed over time. By Week 9, the systolic BP had decreased by 7%, and the diastolic BP had decreased by 11%. The GN systolic BP increased in Week 9, which could have been because it was the week the GN took the Board Exams.

Figure 44 and 45 compare how the BP and competency ratings changed over the course of orientation. At Week 6, when the competency ratings increased, both the systolic and diastolic BP were decreasing.
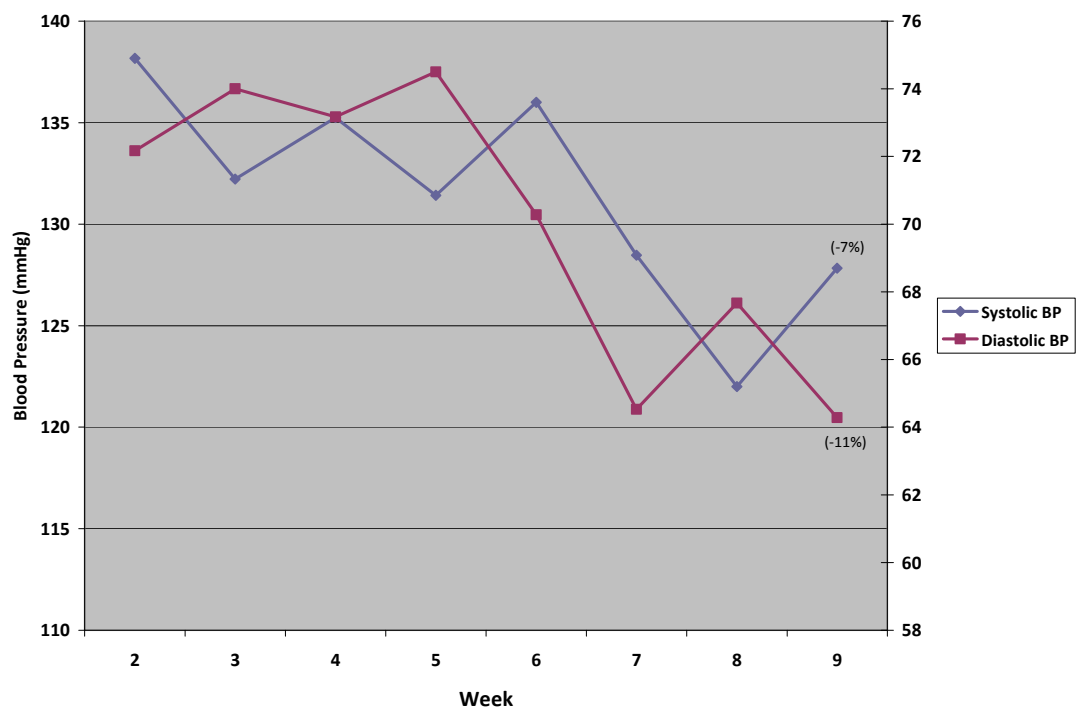
Figure 43 Mean systolic & diastolic blood pressure by week
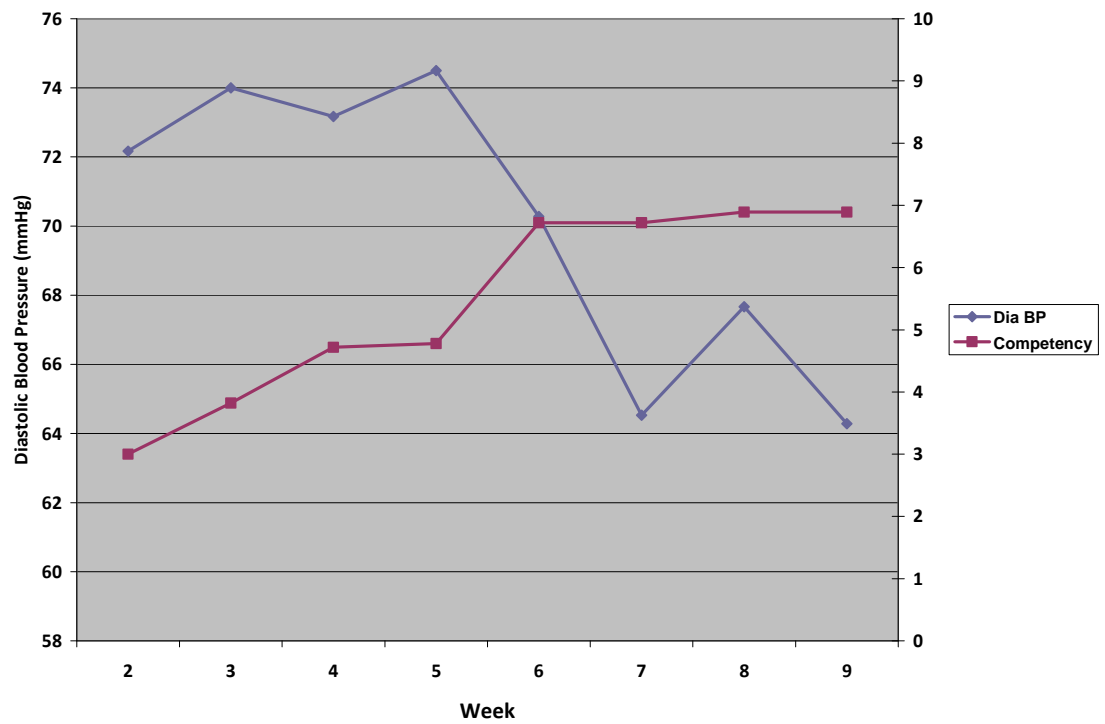
Figure 44 Mean diastolic blood pressure and competency by week

91
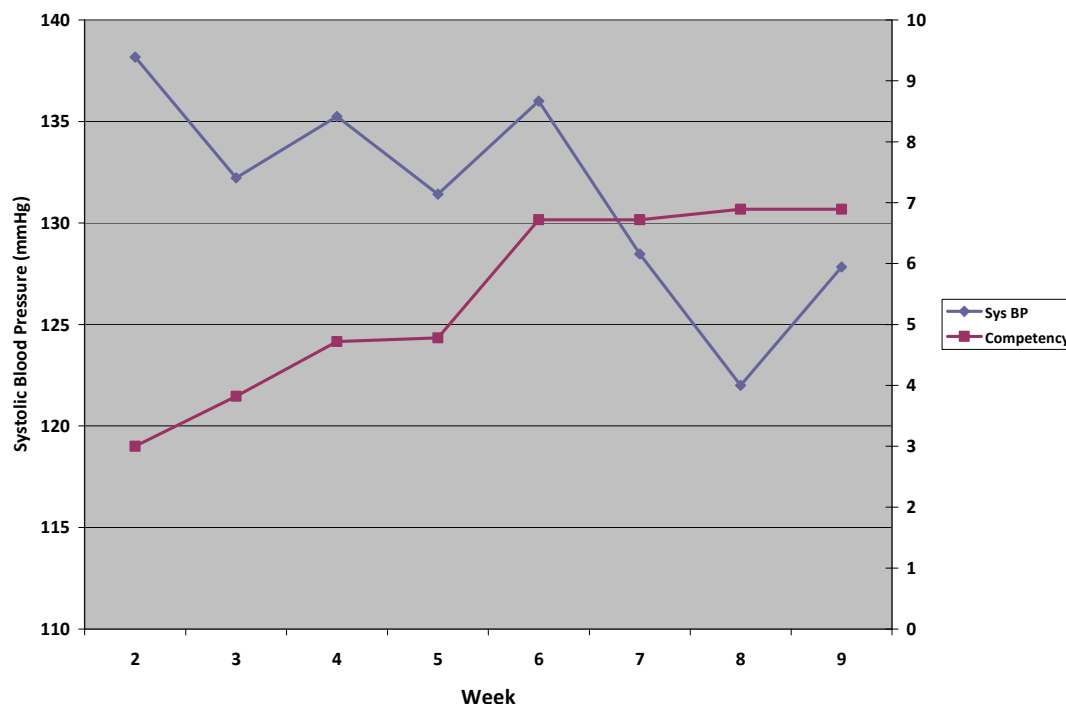
Figure 45 Mean systolic blood pressure and competency by week

3.5.3 Summary of Findings: Stress

Analysis of perceived and physiological stress can be summarized as follows:

- The mean staff stress rating w as slightly higher then the GN rating. However, both staff and GN rated the overall stress of the Unit as "Occasional" or less. Situations relating to Inadequate Preparation had the highest mean stress rating, and situations relating to Lack of Support and Conflict with Other Nurses had the lowest mean stress ratings. Situations relating to Death and Dying became more stressful to the GN over time.

- By Week 9, the GN systolic BP had decreased by 7% and diastolic BP had decreased by 11%. During Week 6, when both systolic and diastolic BP began decreasing, the GN competency ratings increased.

3.6 Overall Summary of Findings

The significance of Week 5 and 6 in the GN orientation was consistent throughout the CWM, competency and stress data. During Week 5 the GN patient census increased from 3 to 4, and the GN administered chemotherapy for the first time. At this point, the GN BP was still high, and competency ratings had reached a plateau. However, in the following week, GN competency ratings increased, BP began to decrease, and the GN began to engage in more Social interaction and Discussing of Patient Care. The frequency of Validation and Being Taught began to decrease, and the average length of time spent interacting with the Orientor also began to decrease. For the duration of Orientation the GN interacted infrequently with doctors, and this pattern did not change even as the GN gained competency.

CHAPTER 4

DISCUSSION & CONCLUSIONS

The Joint Commission Public Policy Initiative (2002) has identified the increasing nursing shortage as a serious issue of concern. A primary reason for the nursing shortage is the high turnover within the Nursing profession, often the result of job dissatisfaction and burnout. High turnover and stress are of particular concern for GN, who struggle to feel competent as they transition from the school environment to the hospital environment. While various formal learning strategies have been implemented, such as mentoring and orientation, these programs are expensive and require considerable time and energy from senior nurses. Not only are formal orientation programs expensive, they do not address the entire picture. The transition experience has been shown to be a complex psycho-social process as the GN struggles with role transformation and sense of belonging (Casey et al., 2004). Not only is the GN required to gain competency with clinical skills, they must learn and understand their Unit's unique history, identity, and style of doing work.

The importance of learning how to become an effective clinical care team member has been demonstrated extensively in the literature. The benefits of teamwork lie not only in improving delivery of complex care (Mickan & Rodger, 2000), but have also been shown to improve nurse's job satisfaction, reduce stress, and reduce intent to leave (Rafferty et al., 2001). Cross-disciplinary communication is imperative for effective teamwork. Research shows that the vast majority of hospital mishaps result from inadequate communication among healthcare staff (US Institute of Medicine, 1999; Coiera, 2000; Patient Safety and Clinical Quality Program, 2005). Studies indicate that the greatest source of knowledge lies within the interconnected web of conversations between hospital staff (Coiera, 2000). And yet, how to facilitate

the GN transition into the clinical care team and foster dynamic communication is not well understood.

According to Communities of Practice (CoP) framework, learning is "fundamentally experiential and social," and occurs through participation rather than passive acquisition. Central to the CoP framework is the concept of knowledge sharing through opportunistic encounters (Becker, 2006), such as the unplanned interactions that can happen while merely passing someone in a corridor. According to Zahn (1991), face-to-face informal communication interactions are particularly important for both the exchange of task information, but also "emotional information and social support." This thesis sought to understand the patterns of communication and interaction of a GN, and the physical locations of these patterns. Furthermore, it examined whether or not there was a relationship between the GN communication and interaction patterns, the gaining of competency, and the reduction of stress.

Analysis of the Communication and Interaction patterns of the GN showed that, while the frequency and length of interactions changed over time, the people who the GN interacted with and the locations in which they occurred did not change over time. However, the analysis did demonstrate how interactions with certain people in certain locations supported the GN transition onto the Unit, and aided the GN in gaining competency and reducing stress.

Making sense of why these interaction, competency and stress patterns were observed requires an understanding of the entire nursing unit system. This discussion will look first at the processes of gaining competency and reducing stress, and the applicability of the communities of practice framework for understanding this process. It will then look at how the physical environment both facilitated and impeded these processes. Finally, these sections will be tied together by discussing the

organizational ecology of the GN transition, and the impact of the various organizational, social and physical factors.

4.1 Gaining Competency and Reducing Stress

The transition experience of a GN from the hospital environment to the school environment has been shown to be a particularly stressful time in a nurse's career (Kramer, 1974; Kelly, 1998; Casey et al, 2004). The stress survey results showed that stress relating to Death and Dying increased over time. This could be attributed to the fact that the GN worked more closely with chemotherapy patients as the orientation progressed, and became personally responsible for administering treatment and supporting the patient and families through end-of-life care. Other frequent sources of stress were "Fear of making a mistake in treating a patient" and "Being asked a question by a patient for which I do not have an answer," both of which demonstrate stress due to lack of knowledge and competency. Despite reporting a few events as frequently stressful, the overall survey results showed that the GN only felt "Occasionally" stressed at both Week 1 and Week 7. Blood pressure readings suggest, however, that perceived stress levels may not be an accurate measure of physiological stress. At the beginning of orientation, the GN blood pressure (BP) averaged 138/72 and decreased steadily to 128/64 by the end of Week 9, showing a 10 mmHg reduction in systolic BP and an 8 mmHg reduction in diastolic BP. According to the study "Impact of a Workplace Stress Reduction Program on Blood Pressure" by McCraty et al (2003), a 10.7 mmHg reduction in systolic BP and 6.7 mmHg reduction in diastolic BP was considered a significant decrease.

The GN also grappled with feeling pressured to perform at a high level due to high staff expectations, based on the excellent reputation that she had developed on the Unit by working as the unit receptionist for 1.5 years. This result was unexpected,

as it was assumed that increased familiarity with the Unit would ease the transition and aide in gaining competency. The experience of the GN reflects the research by Kelly (1998), who discusses the distress that GN experience as they struggle to feel confident, meet theirs and other's expectations, and provide optimum patient care.

The feeling of not having learnt enough to function independently has been cited as a primary reason for high GN stress (Casey et al, 2004). Results supported the hypothesis that, as competency levels increased, blood pressure levels would decrease. As the GN weekly competency ratings increased over the course of orientation, both systolic and diastolic blood pressure began to decrease by a significant amount. By the end of Week 9, the Orientor was impressed with the GN competency, relative to what was expected of a new nurse, and rated the GN as working just below a "Proficient" level. The lowest ratings within the individual competency categories (Rounds, Handoff, Time Management, Critical Thinking, Delegation, and Care Plan) supported the Novice to Expert theory of Dr. Patricia Benner (1984), which proposes that the most challenging aspects of becoming an Expert nurse are developing a highly skilled analytic ability, transitioning from a reliance on rules, and distinguishing relevant information. Despite the lower ratings for higher order skills, the GN exhibited excellent assessment skills which, given the Benner theory, probably contributed to the GN receiving high competency ratings overall.

4.1.1 The Effect of Opportunistic Communication on Competency and Stress

The research literature on the GN transition into the clinical environment has focused on the role played by formal orientation and the preceptor relationship (Godinez et al, 1999; Casey et al., 2004). This thesis focused instead on the role played by opportunistic communication and informal, social learning as aids to gaining competency, reducing stress, and ultimately becoming an effective clinical

team member. Survey results and focused interviews showed the unit to be a collaborative environment that was supportive of learning and sharing knowledge. Analysis of CWM data showed the Unit to be a site of brief, frequent interactions, where GN communication focused on Discussing Patient Care, Socialization, and Validation. The average length of time per interaction ranged from 15s (Providing Assistance) to 25s (Socialization) to 56s (Validation and Being Taught), with literally hundreds of interactions occurring during an 8-hr shift. Given that a "long" interaction was defined as lasting only 60s or more, the Nursing Unit environment truly is a site of very brief opportunistic communication. The GN explained that opportunistic interactions with staff were one of the greatest aides to gaining competency and reducing stress, commenting how "its amazing sometimes you'll find a nurse with the same problem, having the same issue." Social interaction, such as the candid socialization and venting that occurred during lunch breaks, was particularly important for alleviating stress. The Unit's approach to orientation was also crucial in aiding the GN in gaining competency. The Unit encouraged learning through participation, and the Orientor devoted time at the end of every shift for the GN to work on targeted practice directly with patients. The Unit staff would also frequently seek out opportunities for the GN to practice specific skills with a patient. The Orientor's philosophy on learning was to always encourage questioning, and to guide the GN on where to find appropriate information and who to ask, rather than simply providing the answer.

These findings demonstrate the applicability of the communities of practice (CoP) theory to understanding the GN transition into the hospital environment. According to the CoP theory, learning is "fundamentally experiential and social," and occurs through participation rather than passive acquisition (Lave & Wenger, 1991). The process of dynamic interactions with "old-timers" (i.e. experienced Nurses)

allows the new member to gain competency by learning not only technical skills, but also the "tricks" of their trade, understanding the organizational culture, and knowing how to get good information (Becker, 2006). While the Unit as a whole can be viewed as a CoP, there were in fact sub-communities embedded within the Unit. In particular was the community of registered nurse's, many of whom had worked together for 10+ years. From this perspective the fact that the GN, despite being familiar with the Unit, struggled with the expectations of the registered nurse's makes sense. According to Wenger (1998), the process of transitioning into a new community is one of the most "significant challenges faced by learners." When the GN began orientation she was familiar with the Unit as an UR. However, she had to re-negotiate her identity as a member of not just the Unit but, more specifically, as a member of the RN community. As the GN competency increased, the average length of time spent with the Orientor began to decrease, and the frequency of Validation and Being Taught also decreased. At the same time, the frequency of social interactions and time spent with Nurses was increasing. This data illustrates the GN transition from the periphery of the registered nurse CoP to legitimate membership of the nursing unit community.

Even though the Unit was characterized as a collaborative environment that was supportive of learning and sharing knowledge, the CWM data showed that the GN rarely interacted with the doctors. During an average 8-hr shift, the GN interacted with a doctor for approximately 6 minutes, compared to 2 hours with the Orientor and 1 hour with nurses. These findings support the research of Westbrook et al (2007), who used the CWM tool to determine that nurses spent an average of 8 minutes per shift talking with doctors. Furthermore, according to the registered nurses' culture survey responses, one of the lowest scoring questions was "Doctors show respect for the skills and knowledge of the nurses on my unit." And yet, during focused

interviews, the GN described feeling very comfortable approaching a doctor with a question or concern, or to discuss patient care. No definitive explanation was found for these contradictory findings, but a possible reason could be that the GN felt familiar and comfortable with the doctors as a unit receptionist, but not as a registered nurse. The relationship between a unit receptionist and a doctor, where communication is primarily administrative, is very different than with a registered nurse, where communication focuses on discussing and negotiating patient care. The discrepancy in findings could also be due to an assumption by the GN that nurses and doctors don't interact frequently, and therefore the GN may not have seen anything unusual or uncomfortable about her lack of interactions with doctors.

Results showed that a combination of social support from staff, opportunistic sharing of information and participatory learning aided the GN in increasing competency, reducing stress, and becoming part of the Unit team. While previous research has demonstrated the importance of social support, sense of belonging (Casey et al 2004), and informal learning (Hunter et al., 2008) in becoming a clinical team member, research has not focused on the role played by design in facilitating this process. Because this thesis was a single case study, a direct correlation cannot be made between the GN competency level and the design of the unit. However, the data did identify design features that acted as "affordances" – physical elements that either supported or inhibited particular activities and behaviors (Gibson, 1977), such as stimulating information sharing, encouraging social interactions or restricting Unit collaboration.

4.2 Nursing Station Design, Informal Communication, and Learning

Particular design features of the Unit were shown to both support and inhibit opportunistic communication and informal learning, and can be categorized into two

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general design concepts: 1) The creation of different activity zones, and 2) The importance of spatial transparency and physical proximity.

   a) Activity Zones

CWM data showed that a majority of interactions occurred in the nursing station, which supports prior research that centralized nursing stations act as hubs of communication (Gurascio-Howard & Malloch, 2007; Bromberg 2006; Dutta, 2008). However, analysis showed that distinct activity zones existed outside the nursing station that, while having less frequent interactions, played an important role in facilitating particular types of interactions. The GN discussed the importance of brief, opportunistic meetings in what Becker (2007) has describe as backstage rooms, and corridor spaces immediately adjacent to the nursing station. These zones were used for venting about stressful situations, seeing who else was working on the unit, and exchanging information and advice. The backstage rooms consisted of the locker room, kitchen for preparing patient drinks and meals, supply room and soiled linens room (see figure 33). These rooms were enclosed and located behind the nursing station, and were usually the only location that provided both visual and acoustical privacy from the rest of the Unit. Eating lunch in the enclosed break room with other nurses, while not opportunistic, was also an important time for social support, stress reduction, and unification of the Unit.   The break room was also where the GN and Orientor met at the end of the shift for targeted practice of specific skills. In comparison to the rest of the Unit, which could be considered front stage (see figure 23), the back stage spaces provided the GN an opportunity to be "off stage," less guarded, and more comfortable to vent to other nurses, admit uncertainty, and develop a more personal relationship with the nurses. While the backstage area afforded the GN opportunities to bond with the nurses, observation showed that the GN never interacted with a doctor in any of the backstage areas. Furthermore, while the break

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room was not officially designated for nurses, it was never used by the doctors, which encouraged the social separation of nurses and doctors. Therefore, while the GN had frequent informal opportunities to become familiar with the nurses and their culture, the GN rarely had the opportunity for "off-stage" interactions with doctors. This most likely hindered the GN ability to learn the nuances of the doctors' various styles of working, and ultimately would be expected to undermine the ability to develop effective communication and team-work.

A study by Iedema et al (2005) identified what Becker (2007) has called the "neutral zone," which is an area that is not "owned" by any disciplinary group, and a space where social status distinctions are suspended. These neutral zones (see figure 31) have been shown to exist in hospital corridors, and support opportunistic communication and promote learning by providing a safe environment for expressing uncertainty. Data showed that the corridors provided the GN with a space for brief interactions regarding knowledge transfer, socialization, and providing and seeking advice – all forms of informal learning. These interactions often occurred at the supply carts or soiled linen carts outside the patient rooms (see figure 11), where charts could be viewed and patient care discussed. The backstage spaces and adjacent corridors, in addition to providing an opportunity to be "off stage," also acted as a neutral zone where the distinction between the GN and the more experienced nurses was suspended. The research by Iedema et al (2005) focused particularly on the role corridors played in facilitating communication between doctors and nurses. The fact that the GN primarily interacted with doctors around the *outside* edges of the nursing station (see figure 31) can be understood by seeing this area of the nursing station as an extension of the corridor, and therefore a neutral zones. The corridors also provided an important opportunity to suspend the distinction between the GN and the nursing aides. While they rarely interacted in the nursing station or med cart areas,

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they frequently interacted in the corridor, discussing patient care, seeking and providing assistance, and socializing. The importance of effective communication between the GN and nursing aide was expressed by the GN, who explained that a positive working relationship with the nursing aides greatly reduced stress. The corridors also provided an important opportunity for the nursing students to approach the GN and express uncertainty, and the GN to provide advice in return, demonstrating independence and the confidence.

Through analysis of the interactions occurring in the medication areas two distinct zones became apparent (see figure 32). The open med room was a site for non-interactive, quiet work, while the corner med carts were sites for brief, frequent social interactions and knowledge transfer between the GN, Orientor and other nurses, providing an important site for GN learning. Even though the med room was open, there was an unspoken agreement amongst the nurses to not interrupt someone who was in the med room, in effect creating an invisible boundary. The boundary was further enforced by the layout of the med room, which required the nurses to stand with their back to the Unit in order to access the Pyxis medication dispenser. By contrast, when a nurse stood at a med cart they had their backs turned to the patient rooms but faced in towards the nursing unit, therefore encouraging interaction. While the med carts were social spaces, the GN made an important distinction that the social interaction occurring at the med carts was much less personal that what occurred in the backstage areas. This could be because the GN felt "on stage" at the med cart, and therefore had to sensor social conversations.

b) Spatial transparency and physical proximity

Becker (2007) discusses the design concept of "spatial "transparency," which provides greater opportunity for employees to easily see and hear what others are doing as they move about their workspace. The importance of spatial transparency in nursing

stations was demonstrated by Flynn & Barista (2005) and Kalisch & Begeny (2005), who also noted the importance of physical proximity for "synergistic cooperation." In the case of the backstage area, the *lack* of spatial transparency (see figure 33) was important for providing privacy and separation from the frontstage areas. Although visually hidden, the physical proximity of the break room to the nursing station was crucial for promoting frequent use by the nursing staff. As the GN commented, "we like eating together. It's a place for us to be but we're close to our patients…we leave but we don't leave." If the break room had been located off the Unit, the nurses would have felt too far from their patients to use the space regularly, and subsequently lost the opportunity for social support and unification.

A layout feature that demonstrated poor physical proximity was the placement of the corner med carts on either side of the nursing station. This spatial organization split the Unit in half and created two separate working zones (see figure 32). The GN described how the physical division impeded Unit teamwork by separating the staff into two care teams, such that the GN often didn't know exactly who was working on the other side of the Unit. The two places where the nurses would cross paths was in the backstage areas and the break room, which provided important opportunities for unification of the Unit. As the GN noted, "as a whole Unit we'd like to think that we're one big team, but the way that it is set up…our paths just don't have to cross. One of the only times we cross paths is in the break room – there is this unity at this one common area – or when we hide in the clean utility room [laughs]."

The centralized nursing unit permitted physical proximity between the charge nurse, unit receptionist, nurses, and allied health, and as a result there were frequent opportunities to interact and discuss patient care. However, despite the proximity of unofficial doctor's desk (see figure 31) within the nursing unit, the layout positioned doctors with their face to the wall and their back to the Unit. As discussed with the

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open med room, this positioning created an invisible boundary, most likely discouraging opportunistic interaction with other staff. While the Unit was relatively open, the spatial transparency was limited by the placement of two large columns, one in front of each of the corner med carts (see figure 32). The columns restricted visibility across the Unit and further separated the Unit into two teams as the staff often didn't see who was on the other side of the Unit.

4.3 Organizational Ecology of the Graduate Nurse Transition

The GN transition into the Hospital environment is a complex psycho-social experience, where the GN negotiates identity and gradually obtains membership into the nursing unit community. According to the concept of organizational ecology (Becker, 2007), a nursing unit, like any other organization, is characterized by an interdependence of organizational, social and physical systems. Therefore, to truly understand the experience of the GN the entire nursing unit system must be explored. By utilizing five different data collection methods, qualitative and quantitative data was collected and triangulated to make sense of the GN transition. Data analysis revealed five system elements that were key components in understanding how the GN gained competency and reduced stress:

1. *Organization and staffing*

   The GN entered into a Unit where the registered nurses were very experienced and had a well-established community. Many of the Doctors and Allied Health were regulars to the Unit, and therefore the GN was able to become familiar with them and develop a comfortable relationship. The management style of the nurse manager played a large role in the GN feeling welcome and supported on the Unit.

2. GN past experience and Unit expectations

Even though the GN was familiar with the Unit from working as the unit receptionist, the GN had to transition into a new community of registered nurses and learn how to become a member of this group. These findings suggest that familiarity with a Unit doesn't necessarily help a GN to feel more competent and less stressed.

3. Unit Culture

The GN commented on the importance of support from staff in learning and reducing stress. However, despite the supportive, collaborative culture, data showed that the GN interacted very infrequently with the doctors. To the extent that teamwork and collaboration is cross-disciplinary, and involves *both* the nursing staff and doctors, as the literature suggests it should, these findings indicate that a positive, collaborative culture *by itself* is insufficient to insure effective communication among all relevant caregivers.

4. Orientor style and philosophy on learning

The Orientor's philosophy on learning was to guide the GN on where and how to find the appropriate information, rather than simply providing the answer. This approach to orientation aided the GN in gaining effective assessment and analytical skills, which are crucial for becoming an expert nurse. Both the orientor and the other nurses promoted learning by doing, which the GN said was the best aid to gaining competency.

5. Physical design of the Unit

The physical design of the Unit provided affordances for both knowledge transfer and social interactions. Two important design concepts were the creation of different activity zones, and spatial transparency and physical proximity. These findings highlight the need to pay attention to micro zones and design details. While small, such details can significantly influence behaviors and should be considered during both data collection and when designing nursing units.

4.4 Implications for practice

This research suggests that formal approaches to GN orientation which focus on the effective one-on-one interaction with a designated mentor, can and would benefit by insuring a supportive unit culture and purposeful design interventions. With these combined factors, it may be possible to increase GN competency more quickly, reduce stress, facilitate effective teamwork and communication, and ultimately improve the quality of patient care. As such, time required for orientation would be reduced, which would decrease demands on senior nurses and ultimately result in significant cost savings for the hospital. The likelihood of GN retention may also improve, which would help remedy the current nursing shortage. The research also shows that, even in a well-functioning Unit characterized by support, trust and collaboration, the GN still interacts very infrequently with the doctors. Therefore, the physical layout could serve as a powerful tool to encourage and facilitate GN-doctor and nurse-doctor interactions, and the participation in multi-disciplinary care teams.

The results highlighted the need to pay attention to micro zones and design details during both data collection and when designing nursing units. For example, placement of a break room on the Unit is a crucial design consideration for facilitating social support and unification. While staff talked about preferring a larger space, the

importance of collocation would seem to surpass the need for more space. Another important consideration may be who the break room is designed for, and the cultural assumptions about who should use the space. The break room on the nursing unit was clearly a space designed and designated for nurses, which encouraged the social separation of nurses and doctors. However, if a break room was purposefully designed to be shared, it would increase the potential for more effective multi-disciplinary team-work by providing opportunities for informal communication and development of a more cross-disciplinary integrated community of practice.

The physical distinction between back stage and front stage was also important, providing visual and acoustical privacy from patients and families and facilitating opportunistic social interactions between staff. The design and placement of the med carts was both positive and negative. The concept of a med cart area that contains milder patient medications works effectively to create hubs of opportunistic communication, and an ideal location for validation and teaching between the Orientor and GN. However, the challenge is placing them on the Unit such that they don't physically divide the staff into separate teams. Insuring spatial transparency across the Unit also helps to foster teamwork and Unit cohesiveness. The design of the corridor spaces should also be considered, as these neutral zones are important for promoting cross-discipline interactions. As corridor discussions often relate to patient care, the creation of pull-off areas along the corridor could help preserve privacy and encourage more candid discussions of patient care. The placement of small dual-purpose kiosks (such as a modified version of the current supply carts) outside every patient room could provide a space for various staff to meet informally, look over patient charts, and discuss patient care.

4.5 Limitations

The greatest limitation of this research was that it was a single case study involving only one unit. While this provided a unique opportunity to gain a very in-depth understanding of the entire nursing unit system, the data has very little external reliability. Furthermore, a direct correlation between the physical layout, GN competency and stress levels cannot be determined, as there were no comparison sites.

Another limitation, which was beyond the researcher's control, was that the GN orientation was cut three weeks short, at the end of Week 9. While this time period still provided substantial data, it would have been interesting to see whether the GN stress levels (blood pressure) continued to decrease, or if the competency levels increased or continued to plateau. This would have provided insight into whether 12 weeks is really necessary for orientation, or if a shorter formal orientation period could be just as effective. The amount of data collected was further limited by the distance of the research site (90 miles away), and the frequent severe weather than often made traveling impossible. As such, only 23 hours of data were collected, once or twice a week. Collection of survey and interview data was also limited because of the staffs' busy schedules and difficulty of taking a break during a shift. The fact that the researchers were only at the Hospital once or twice a week for a few hours at a time only exacerbated the situation.

A technical limitation was that the CWM tool had never been used to collect locational data, and new communication categories were being tested for the first time. Two important communication categories, Validation and Discussing Patient Care, turned out to be closely related and hard to distinguish reliably in practice even though pilot data was collected and categories modified accordingly. It wasn't until the data was analyzed that the researchers realized that the location and communication categories were not sensitive enough to capture the subtle but significant nuances of

the communication and interaction patterns, or the locations where these occurred on the unit. In part this came from the initial focus of the research on the difference between decentralized vs. centralized designs. It became clear only toward the end of the data collection process that, given the focus on informal learning and its relation to stress and gaining of competencies, that consideration of backstage and neutral zone areas vs. frontstage areas was more relevant than the degree of centralization or decentralization of the nursing station (which turned out not to be possible to examine in any case).

4.6 Directions for Future Research

Prior to this research, studies on the design of nursing units has centered around the debate of centralized vs. decentralized layout, and corridor spaces, and the effect on communication, nurse fatigue, and quality of patient care. However, this research suggests that shifting the focus to backstage (rather than frontstage) areas may offer a better understanding of how the design of a nursing unit influences opportunistic communication and informal learning. Specifically, understanding in detail the communication and interaction patterns that occur in break rooms, lounges, cafeterias, enclosed med rooms, kitchens, locker rooms and utility rooms. This doesn't mean to say that the centralized vs. decentralized debate should be abandoned, but rather simply adds a new dimension to the debate.

Further investigation into the role played by backstage areas could be done both by shadowing using the CWM tool, or by placing audio recorders in these rooms. It would be useful to compare Unit designs that have distinct backstage areas, and Units that do not, and compare where, if at all, social venting and staff bonding occurs. This research could focus specifically on the GN transition and gaining competency, and also more generally on the existence and effectiveness of multi-disciplinary care

teams. In order to obtain more representative data, the researchers could collect data for intensive week-long periods of time, rather than once or twice a week.

An important consideration for future research involving larger sample sizes is developing a systematic method for quantitative data collection. Given the difficulties of collecting both survey and interview data in this study, it would be important to determine what factors influence a Unit's willingness to participate, and how to find time for substantial focused interviews, despite the staffs' busy schedules.

APPENDIX A.

Study Description Email

Cornell University Research Project:
Graduate Nurse Study

Who: 2 graduate students, Rosie Adams and Sarah Hammer, from Cornell University will be conducting research for their Master's thesis.

Purpose: To explore ways to reduce the stress and increase the gaining of competencies among new nurse graduates. Specifically, they will be investigating how the design and layout of the nursing unit affects informal communication and learning among new nurse graduates during their orientation period.

What: Rosie and Sarah will be "shadowing" (i.e. following at a distance) new nurse graduates and recording their tasks and interactions on a PDA (Palm Pilot). In no way will the shadowing interfere with the work of the nurses, and all recorded data will remain anonymous.

When: Rosie and Sarah will be collecting data starting January 14th for the duration of the 12-week orientation period. They will be on the units 1-2 days per week for 2-hour shifts, once in the morning and again in the afternoon.

APPENDIX B.

Staff Consent Form

Informed Consent Form for Staff

Title of Study: The Role of Physical Design and Informal Communication and Learning in Reducing Stress and Gaining Competency Among New Nurse Graduates

Background/Purpose: You are invited to take part in a Cornell University-Crouse Hospital research study exploring ways to reduce the stress and increase the gaining of nursing competencies among new nurse graduates (NNG). Specifically, the purpose of this study is to learn how the design and layout of hospital facilities influence informal communication, interaction, and learning among new nurse graduates during the formal orientation process on a medical unit; and to explore the relationship between such communication patterns and job stress, job satisfaction, and gaining of nursing competencies. Please read this form carefully and ask any questions you may have before agreeing to take part in the study.

Procedures: If you agree to be in this study you will be asked to participate in the following activities during your 3 month orientation period. The time commitment will be minimal and all data will remain anonymous.

- Fill out a brief questionnaire three times during the twelve week new nurse formal orientation period for a total of three surveys. Survey completion will occur while you are at work and should take no more than 20 minutes of your time per survey.
- Participate in brief interviews at your convenience at various times during the research observation period. The purpose of the interviews is to better understand the new nurses's experience from your perspective. When convenient, we will ask to record the conversations using a portable digital recorder. If you decline, no recorder will be used. Transcriptions of the recordings will remain anonymous in all presentations and reports of the findings. Recording interviews simply allows the researcher to focus on what the nurse is saying, rather than trying to manually capture the discussion; and to let the nurses'own voices be heard (anonymously) in presenting the findings.

Additional data collection methods employed in this study but which require no direct time or involvement on your part will include:

- Members of the Cornell research team "shadowing" (i.e. following at a distance) new nurse graduates to track type and duration of interactions with other staff (such as yourself) using a Palm Pilot programmed for this form of data collection. In no way will the shadowing interfere with your work, and all recorded data will remain anonymous.
- An evaluation of the physical qualities (e.g., the design, layout) of your work setting such as the nurse station, break and lounge areas, and even the general building itself so that we can better understand and describe the physical setting in which you work.

Voluntary Participation: Your participation in this study is entirely voluntary and you may refuse to participate in part or all of the study, or discontinue participation at any time without penalty. Your decision about whether or not you participate in the study

will not affect your current or future relationship with Cornell University or Crouse Hospital.

Risks and Benefits: We do not anticipate any risks to you participating in this study other than those encountered in the day-to-day routine of a new nurse.

There are no direct benefits to you other than that of contributing to the scientific knowledge in this field. The degree of stress experienced by new nurses is well documented and we hope to better understand how multiple factors in the work environment of new nurse graduates contribute to their health and well being. We do expect that the results of this research will contribute to the growing body of knowledge of evidence-based design that is helping transform hospital design.

Alternatives:
1. If you decide that you don't want to participate in certain aspects of the study you may still participate in the aspects of the study for which you provide consent.
2. If, at any point during the study, you decide to withdraw from part of the study, you will continue with the remaining aspects of the study as originally planned.

Costs/Payments: There will be no payment for your participation, and there will be no costs to you for participating.

Confidentiality. The records of this study will be kept private. In any presentation or report of the study findings we make public we will not include any information that will make it possible to identify you. Crouse Hospital will not have access to any individual's data collected by the Cornell Team (ie., survey data, interaction data, blood pressure data, interview data). Research records will be kept in a locked file in the research team's offices at Cornell University. Only the researchers will have access to the records.

You may change your mind and take back this authorization at any time by writing to Professor Franklin Becker (see below). If you do this you will no longer be able to participate in the research. However, even if you take back this authorization, the information already obtained may be used and shared as permitted by this Informed Consent.

Questions: The Principal Investigator for this study is Franklin Becker, Professor of Design & Environmental Analysis, Cornell University. Please ask any questions you have now. If you have questions later, you may contact Professor Becker at fdb2@cornell.edu or at 607.255.1950. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Cornell University Committee on Human Subjects (UCHS) at 607-255-5138 or access their website at http://www.osp.cornell.edu/Compliance/UCHS/homepageUCHS.htm. This project has also been reviewed and approved by the Crouse Institutional Review Board (IRB).

You will be given a copy of this form to keep for your records.

Consent to participate in research: I have read the above information, and have received answers to any questions I asked. I consent to take part in the study.

_____   _____

Signature of subject   Date

Exceptions to consent (if applicable):_____
_____

Consent to audio-record interviews: _____

_____   _____

Signature of person obtaining consent   Date

UCHS Approval: UCHS Expiration:

APPENDIX C.

Graduate Nurse Consent Form

Informed Consent Form for New Nurse Graduates

Title of Study: The Role of Physical Design of Nursing Units On Informal
Communication and Learning among New Nurse Graduates

Background/Purpose: You are invited to take part in a Cornell University-Crouse
Hospital research study exploring ways to reduce the stress and increase the gaining of
nursing competencies among new nurse graduates (NNG). Specifically, the purpose of
this study is to learn how the design and layout of hospital physical facilities influence
informal communication, interaction, and learning among new nurse graduates during the
formal orientation process on a medical unit; and to explore the relationship between
such communication patterns and job stress, job satisfaction, and gaining of nursing
competencies.. Please read this form carefully and ask any questions you may have
before agreeing to take part in the study.

Procedures: If you agree to be in this study you will be asked to participate in the
following activities during your 3 month orientation period. The time commitment will
be minimal and all data will remain anonymous.

- Self obtain daily blood pressure readings using a designated blood pressure machine located on
  your floor each day that you work. During each shift we will ask that you obtain six readings daily
  in the following manner; two consecutive readings taken 5 minutes prior to the start of your shift,
  two consecutive readings following your lunch break, and two consecutive readings immediately
  following the conclusion of your shift for a total of six readings daily. This will require that you
  come to work 10 minutes prior to the start of your shift so as to obtain the first set of readings five
  minutes prior to beginning work. Each reading should take approximately 20 seconds resulting in
  a total of twelve minutes per day.
- Fill out a brief questionnaire three times during the twelve week new nurse formal orientation
  period for a total of three surveys. Survey completion will occur while you are at work and should
  take no more than 20 minutes of your time per survey.
- Participate in brief interviews at your convenience at various times during the research
  observation period. The purpose of the interviews is to better understand the new nurses's
  experience from your perspective. When convenient, we will ask to record the conversations
  using a portable digital recorder. If you decline, no recorder will be used. Transcriptions of the
  recordings will remain anonymous in all presentations and reports of the findings. Recording
  interviews simply allows the researcher to focus on what the nurse is saying, rather than trying to
  manually capture the discussion; and to let the nurses'own voices be heard (anonymously) in
  presenting the findings.

Additional data collection methods employed in this study but which require no direct
time or involvement on your part will include:

- Members of the Cornell research team "shadowing" (i.e., following at a distance) new nurse
  graduates such as yourself a few days a week for two hours at a time during a twelve hour shift
  while you work, recording the tasks that you perform as well as with whom you interact on a PDA
  (like a Palm Pilot) programmed for this form of data collection. In no way will the shadowing
  interfere with your work, and all recorded data will remain anonymous.

- An evaluation of the physical qualities (e.g., the design, layout) of your work setting such as the nurse station, break and lounge areas, and even the general building itself so that we can better understand and describe the physical setting in which you work.
- Access to the initial self-assessment form and weekly evaluation sheets (completed jointly by both yourself and your preceptor), which are both components of the regular orientation program. As with all other data collected, this information will be kept strictly confidential and anonymous in all presentation and reports of the study.

Voluntary Participation: Your participation in this study is entirely voluntary and you may refuse to participate in part or all of the study, or discontinue participation at any time without penalty. Your decision about whether or not you participate in the study will not affect your current or future relationship with Cornell University or Crouse Hospital.

Risks and Benefits: We do not anticipate any risks to you participating in this study other than those encountered in the day-to-day routine of a new nurse.

There are no direct benefits to you other than that of contributing to the scientific knowledge in this field. The degree of stress experienced by new nurses is well documented and we hope to better understand how multiple factors in the work environment of new nurse graduates contribute to their health and well being. We do expect that the results of this research will contribute to the growing body of knowledge of evidence-based design that is helping transform hospital design.

Alternatives:
1. If you decide that you don't want to participate in certain aspects of the study you may still participate in the aspects of the study for which you provide consent.
2. If, at any point during the study, you decide to withdraw from part of the study, you will continue with the remaining aspects of the study as originally planned.

Costs/Payments: As partial compensation for your time, we will offer you a $50 gift certificate at the Carousel Mall for completion of the blood pressure and survey components of the data collection. Additionally, you will receive seven $2 vouchers to be used at the Crouse cafeteria. We will also provide you a summary of our study results when the project is completed. There will be no costs to your for participating.

Confidentiality. The records of this study will be kept private. In any presentation or report of the study findings we make public we will not include any information that will make it possible to identify you. Crouse Hospital will not have access to any individual's data collected by the Cornell Team (ie., survey data, interaction data, blood pressure data, interview data). Research records will be kept in a locked file in the research team's offices at Cornell University. Only the researchers will have access to the records.

You may change your mind and take back this authorization at any time by writing to Professor Franklin Becker (see below). If you do this you will no longer be able to participate in the research. However, even if you take back this authorization, the information already obtained may be used and shared as permitted by this Informed Consent.

Questions: The Principal Investigator for this study is Franklin Becker, Professor of Design & Environmental Analysis, Cornell University. Please ask any questions you have now. If you have questions later, you may contact Professor Becker at fdb2@cornell.edu or at 607.255.1950. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Cornell University Committee on Human Subjects (UCHS) at 607-255-5138 or access their website at http://www.osp.cornell.edu/Compliance/UCHS/homepageUCHS.htm. This project has also been reviewed and approved by the Crouse Institutional Review Board (IRB).

You will be given a copy of this form to keep for your records.

Consent to participate in research: I have read the above information, and have received answers to any questions I asked. I consent to take part in the study.

_____   _____

Signature of subject   Date

Exceptions to consent (if applicable):_____

_____

Consent to audio-record interviews: _____

_____   _____

Signature of person obtaining consent   Date

UCHS Approval: UCHS Expiration:

APPENDIX D.

Modified CWM categories, definitions, and rules

Updated CWM Tool Categories & Definitions

Location Categories

Break room
Backstage
Corridor
Charge Nurse Desk
Nursing Station
Medication room

With-Whom Categories

Charge Nurse…………………………………………………...	NURSE
IV Team…………………………………………………….	NURSE
Nursing students………………………………………………..	NURSE
Nurse Manager…………………………………………………	NURSE
Nurse Practitioner………………………………………………	DOCTOR
Med Student…………………………………………………….	DOCTOR
Nursing Assistant………………………………………………	ALLIED HEALTH
Physical Therapy……………………………………………….	ALLIED HEALTH
Dietician………………………………………………………	ALLIED HEALTH
Care Coordinator………………………………………………	ALLIED HEALTH
Housekeeping………………………………………………….	OTHER
Maintenance……………………………………………………	OTHER
IT……………………………………………………………...	OTHER
Unit Receptionist………………………………………………	OTHER

Communication Categories & Definitions

<u>PATIENT</u>
- In patient room alone

<u>PATIENT INTERACTIVE</u>
- In patient room with at least one other person i.e. visitor, doctor, other nurse

<u>NON INTERACTIVE</u>
- Any task done alone

<u>SOCIAL</u>
- Any interaction that is non work related
    - Exception: Venting about work related task, such as complaining or expressing frustration

<u>WORK INTERACTIVE</u>
1. Admin
    - Any activity which relates to the running of the ward in general, including organization of unit staff and resources i.e. staff meetings, bed allocation, staff coordination, scheduling

2. Being Taught
    - Actively being taught new skills or information; initiated deliberately by other staff member

3. Seeking Assistance
    - Seeking assistance with equipment, procedures, data entry, locating people or items
        - Important: Does not refer to a lack of skills or clinical knowledge

4. Seeking Advice
    - Seeking advice or guidance regarding lack of a skill or clinical knowledge
        - Example: Asking how to do a procedure or how to administer a medication

5. Discussing patient care
    - Discussing information with another caregiver or visitor regarding patient status or care plan
        - Example: Handover at end of shift, checking if patient received medication

6. Providing Assistance
    - Providing assistance with equipment, procedures, data entry, locating people or items
        - Important: Does not refer to a lack of skills or clinical knowledge

7. Providing Advice
    - Providing advice or guidance regarding lack of a skill or clinical knowledge
        - Example: Advice on how to do a procedure or how to administer a medication

8. Validation
   - Verifying the accuracy or appropriateness of a decision, procedure, care plan, strategy, approach

9. Other

Rules for CWM Tool

<u>IN TRANSIT</u>
- Coding: "Non Interactive" + "No one"
- DO NOT enter a location
- Use when the nurse is in transit and not doing a task
- Purpose: to indicate when the previous task stopped, so that time spent walking is not included in task time

<u>When to use ADD, INTERUPT or NEW TASK</u>
- If another person joins a conversation and
  1. Is of the same "with whom" category
  2. Does not change the topic of conversation
  …then DO NOTHING
- If another person joins a conversation and
  1. Is of the same or different "with whom" category
  2. Changes the topic of conversation
  ….then it is an INTERUPT
- If another person joins a conversation and
  1. Is of a different "with whom" category
  2. Does not change the topic of conversation
  …then it is an ADD (multi-tasking)
- If two or more people are having a conversation and
  1. The topic of conversation changes
  ….then it is an ADD (multi-tasking)

APPENDIX E.

Blood Pressure Recording Sheet

Cornell University
College of Human Ecology

DAILY BLOOD PRESSURE READINGS

Participant ID: 1

DATE	A.M. READINGS		NOON READINGS		P.M. READINGS	
	First	Second	First	Second	First	Second

APPENDIX F.

Survey: Learning, Culture & Stress

New Graduate Nurse Workplace Survey

This survey is one of several methods being used to collect data as part of the study on "The Role of Physical Design and Informal Communication and Learning in Reducing Stress and Gaining Competency among New Nurse Graduates". The only people who will see completed surveys are members of the Cornell research team. No names will appear anywhere in any reported data analysis, publications, or reports. All data will be reported at an aggregate level, with no personal identifying information. All participation is voluntary. The goal of the study is to improve the design of health care facilities for staff, patients, and visitors. If you have any questions, please contact,

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Thank you very much for your participation. It is greatly appreciated.

Please indicate, to what extent you *agree* or *disagree* with the following statements according to your experience

		Strongly Disagree						Strongly Agree
1	I feel comfortable approaching nurses on my unit for help or advice	1	2	3	4	5	6	7
2	I frequently collaborate with nurses on my unit to come up with mutually acceptable decisions	1	2	3	4	5	6	7
3	I exchange information/ideas frequently with nurses through face-to-face communication	1	2	3	4	5	6	7
4	The process of trial and error is an aid to my learning	1	2	3	4	5	6	7
5	There is effective teamwork and collaboration between different levels of the nursing staff	1	2	3	4	5	6	7
6	I know who to approach when I need specific help or advice on a clinical issue	1	2	3	4	5	6	7
7	Physicians and nurses on my unit have a good working relationship	1	2	3	4	5	6	7
8	New and innovative ideas about patient care are encouraged on my unit	1	2	3	4	5	6	7
9	Nurses on my unit often share their learning experiences with each other	1	2	3	4	5	6	7
10	Nurses on my unit share knowledge and expertise with one another	1	2	3	4	5	6	7
11	Nurses on my unit who learn new skills are rewarded	1	2	3	4	5	6	7
12	There is a strong climate of trust within my unit	1	2	3	4	5	6	7
13	I am satisfied with what I have learned since joining this unit	1	2	3	4	5	6	7
14	Other nurses on my unit ask me what I feel I need to learn to do my job more effectively	1	2	3	4	5	6	7
15	A feeling of unity exists within my unit	1	2	3	4	5	6	7

16	Nurses on my unit work with me to solve problems	1	2	3	4	5	6	7
17	Everyday work activities are aids to my learning	1	2	3	4	5	6	7
18	Nurses on my unit are given opportunities to take on challenging tasks	1	2	3	4	5	6	7
19	Nurses on my unit provide on-the-job training when I need it	1	2	3	4	5	6	7
20	Nurses on my unit often take time to figure out ways to improve how work is done	1	2	3	4	5	6	7
21	Nurses on my unit are aids to my learning	1	2	3	4	5	6	7
22	Nurses on my unit provide constructive feedback on my performance	1	2	3	4	5	6	7
23	Doctors show respect for the skills and knowledge of the nurses on my unit	1	2	3	4	5	6	7
24	Nurses on my unit all pitch in when we need extra help	1	2	3	4	5	6	7
25	Nurses on my unit tolerate mistakes when someone is learning a new task or skill	1	2	3	4	5	6	7
26	On-the-job training is an aid to my learning	1	2	3	4	5	6	7
27	Nurses on my unit are friendly and outgoing	1	2	3	4	5	6	7
28	Observing and listening are aids to my learning	1	2	3	4	5	6	7
29	I am satisfied with my personal development since joining this unit	1	2	3	4	5	6	7
30	I feel well-informed about the current activities on my unit	1	2	3	4	5	6	7
31	My training in this unit didn't cover the basics I need to know	1	2	3	4	5	6	7
32	There is little encouragement to learn new skills	1	2	3	4	5	6	7

How *often*, on your present unit, have you found the following situations to be *stressful*?

		Never	Occasionally	Frequently	Very Frequently
1	Breakdown of computer	N	O	F	VF
2	Criticism of physician	N	O	F	VF
3	Performing procedures that patients experience as painful	N	O	F	VF
4	Feeling helpless in the case of a patient who fails to improve	N	O	F	VF
5	Conflict with supervisor	N	O	F	VF
6	Listening or talking to a patient about his/her approaching death	N	O	F	VF
7	Lack of an opportunity to talk openly with other unit personnel about problems on the unit	N	O	F	VF
8	The death of a patient	N	O	F	VF
9	Conflict with a physician	N	O	F	VF
10	Fear of making a mistake in treating a patient	N	O	F	VF
11	Lack of an opportunity to share experiences and feelings with other personnel on the unit	N	O	F	VF
12	The death of a patient with whom you developed a close friendship	N	O	F	VF
13	Physician not being present when a patient dies	N	O	F	VF
14	Disagreement concerning the treatment of a patient	N	O	F	VF
15	Feeling inadequately prepared to help with the emotional needs of a patient's family	N	O	F	VF
16	Lack of an opportunity to express to other personnel on the unit my negative feelings toward patients	N	O	F	VF
17	Inadequate information from a physician regarding the medical condition of a patient	N	O	F	VF
18	Being asked a question by a patient for which I do not have a satisfactory answer	N	O	F	VF
19	Making a decision concerning a patient when the physician is unavailable	N	O	F	VF
20	Floating to other units that are short-staffed	N	O	F	VF
21	Watching a patient suffer	N	O	F	VF
22	Difficulty in working with a particular nurse (or nurses) outside the unit	N	O	F	VF
23	Feeling inadequately prepared to help with the emotional needs of a patient	N	O	F	VF
24	Criticism by a supervisor	N	O	F	VF
25	Unpredictable staffing and scheduling	N	O	F	VF
26	A physician ordering what appears to be inappropriate treatment for a patient	N	O	F	VF

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27	Too many non-nursing tasks required, such as clerical work	N	O	F	VF
28	Not enough time to provide emotional support to a patient	N	O	F	VF
29	Difficulty in working with a particular nurse (or nurses) on the unit	N	O	F	VF
30	Not enough time to complete all of my nursing tasks	N	O	F	VF
31	A physician not being present in a medical emergency	N	O	F	VF
32	Not knowing what a patient or a patient's family ought to be told about the patient's condition and its treatment	N	O	F	VF
33	Uncertainty regarding the operation and functioning of specialized equipment	N	O	F	VF
34	Not enough staff to adequatly cover the unit	N	O	F	VF

APPENDIX G.

Competency Rating Tool

New Nurse Graduate Orientation
Skill Set Evaluation

Please use the provided scale to rate the orientee's competency in the following skills:
Check the appropriate number

	Novice		Advanced Beginner		Competent		Proficient			Expert
1. **Unit rounds - Multidisciplinary rounds**	1	2	3	4	5	6	7	8	9	10
2. **Report & Handoff** -change of shift/transfer	1	2	3	4	5	6	7	8	9	10
3. **Medications - administration process**	1	2	3	4	5	6	7	8	9	10
4. **Computer**										
a. Patient Education - care notes	1	2	3	4	5	6	7	8	9	10
b. Labs & Test Results- Net access	1	2	3	4	5	6	7	8	9	10
c. Policy & Procedure -locating, and using	1	2	3	4	5	6	7	8	9	10
5. **Discharge -** process	1	2	3	4	5	6	7	8	9	10
6. **Admission -** process	1	2	3	4	5	6	7	8	9	10
7. **Independence** (on assignments)	1	2	3	4	5	6	7	8	9	10
8. **Prioritization**	1	2	3	4	5	6	7	8	9	10
9. **Time Management**	1	2	3	4	5	6	7	8	9	10
10. **Critical Thinking**	1	2	3	4	5	6	7	8	9	10
11. **Delegation & Follow Through**	1	2	3	4	5	6	7	8	9	10
12. **Care Plan-** Identifying appropriately	1	2	3	4	5	6	7	8	9	10
13. **Identifying & Utilizing Resources**	1	2	3	4	5	6	7	8	9	10
14. **Documentation**	1	2	3	4	5	6	7	8	9	10
15. **Communication**										
a. Family & Patients	1	2	3	4	5	6	7	8	9	10
b. With co-workers	1	2	3	4	5	6	7	8	9	10

APPENDIX H.

Competency Category Definitions

Competency Category Definitions

1. Unit Rounds

- o *Novice* – answers questions about the patient

- o *Expert* – explains patients' medical needs and diagnoses, nursing care relating to discharge; able to identify other disciplines that need to be consulted prior to patient discharge; able to follow up on patient care needs that are identified on rounds; able to facilitate rounds without need for prompting

2. Report and Handoff

- o *Novice* – repeats what was heard at the beginning of own shift during handoff and states any major changes

- o *Expert* – doesn't merely repeat info but also identifies key issues that need further assessment or follow up

3. Medications

- o *Novice* – gives medications on time, but slow; needs to be prompted to check for drug interactions

- o *Expert* – administers medication on time; checks for negative reactions/drug interactions without prompting; checks for appropriateness of a drug based on patient condition; educates patient on self-administration of medication; questions physician or pharmacy if medication is thought to be inappropriate in type or amount

4. Computer: Patient Education

- o *Novice* – accesses Care Notes (web-based patient education program) and searches for a topic

- o *Expert* – proactively gathers info for patients; uses discretion regarding the type and form of information given based on individual patient needs and competencies.

5. Computer: Labs and Test Results

- o *Novice* – accesses Net Access, looks at labs and write down info

- *Expert* – interprets labs; consults physician when labs are abnormal; recognizes patterns in labs that signify changes in patient condition; correlates patient's physical symptoms to the labs that correspond to those symptoms

6. Computer: Policy and Procedure

- *Novice* – accesses Crouse's internal search engine to look up policies and procedures (dictates what a nurse can and can't do and should and shouldn't do)

- *Expert* – questions policies and procedures when it might not be appropriate for a given situation (based on their clinical expertise) and brings it to the attention of the appropriate staff member; violates policies if based on a matter of patient safety

7. Discharge

- *Novice* – accomplishes the task; reviews discharge docs; removes IV

- *Expert* – assesses patient safety; verifies that patient understands medications, instructions, and makes sure they're going home to an appropriate environment; verifies that patient is going home with proper supplies (cane, nebulizer, etc); prepares patient for discharge from the time of admission; works with family, not just patient, during the process

8. Admission

- *Novice* – gets patient into the bed, starts physician's orders, checks vitals

- *Expert* – makes sure medications are consistent with what they're taking at home; understands diagnosis and sets room up in advance (proper equipment); examines psychosocial issues and works with family (may have to stop normal work tasks to do this); charts out course of hospitalization for the patient (tests, duration of stay, when physician will see patient)

9. Independence

- *Novice* – needs someone to tell them what to do at all times

- *Expert* – needs no input from orientor; approaches orientor when they have never performed a task and suggests a way to proceed versus having no plan

10. Prioritization

- o *Novice* – needs to be told what to do first (which task, which patient to see first); often will perform tasks in systematic order instead of prioritizing

- o *Expert* – decides who is the most critically ill patient at that time and can modify as day goes on and as patient status changes; recognizes when multiple patients/tasks are equally important and can delegate

11. Time Management

- o *Novice* – often fails to complete tasks on time; tends to stay late beyond shift; often needs someone else to step in so that work will get completed

- o *Expert* – completes routine tasks on time; adjusts when patient conditions change, but manages to stay on time with tasks; has time for break, has time for other tasks (patient education, time to discuss psychosocial aspects with patients/family)

12. Critical Thinking

- o *Novice* – performs little critical thinking because of lack of experiential knowledge; tends not to think critically because of being so focused on the task at hand

- o *Expert* – draws from experiential and theoretical knowledge and relates current situations to situations that they've seen before and develops a hypothesis for what they think is going on

13. Delegation & Follow through

- o *Novice* – fails to recognize when delegation is needed; lacks knowledge on how to delegate

- o *Expert* – recognizes when delegation is needed (not necessarily when they're very busy); has mastered the social skills needed to delegate (using the right words when delegating so that person feels important and not like they're being ordered around); follows through to ensure that the task was completed; recognizes that they're ultimately responsible for the task; deals effectively with the person they delegated the task to

14. Care Plan

- *Novice* – identifies the main problems with the patient

- *Expert* – plans for potential or future needs (needs associated with the main problem that may potentially arise)

15. Identifying and Utilizing Resources

- *Novice* – often overwhelmed and fails to identify who they should ask for help

- *Expert* – recognizes when they're overwhelmed; knows when something is outside their realm of knowledge and knows who to approach; knows who to contact, know who "back-up" people are if main contacts are unavailable; utilizes other appropriate sources of info such as internet

16. Documentation

- *Novice* – documents what they're told to document

- *Expert* – writes a note that will explain in more detail about a focused area and report what was done and not done; gives a narrative of what was done, not just the basics

17. Communication family and patient

- *Novice* – often so focused on tasks that they don't have the ability to pick up on subtle cues from family or patient about what the patient really needs/wants; lacks skill in dealing with irate or upset patients

- *Expert* – picks up on subtle cues; asks patient what his/her goals are for the day; completes tasks as if they're second nature while also communicating with patient, which is the main priority.

18. Communication Co-workers
- *Novice* – often timid or hesitant to talk to co-workers; lacks knowledge regarding what kind of info to communicate; fails to gather all the info before talking to the physician/allied health

APPENDIX I.

Example Interview Guide

Interview Guide for GN

We're interested in how the design and layout of the unit affects on-the-job learning and communication with other RNs and doctors. By that I mean how the design affects how often and where you interact with others for certain types of communication and discuss certain things. I'm asking this because people often learn "on the job" from informally talking with others and asking questions.

Observations

1. I noticed that, even though the med room was open, staff usually did not interrupt a nurse who was in the med area using the Pyxis or gathering meds. Would you agree with this? Why do you think this was? How do you think having an open med room affected your ability to accurately administer meds?

2. I noticed that, unlike the med room, nurses often communicated with each other while at the med cart stations. Would you agree with this? Why do you think nurses communicated at the med cart stations, but rarely in the med room? How do you think having frequent communication at the med cart stations affected your ability to accurately administer meds?

3. I also noticed that the med cart stations often seemed like an area where you could vent about a patient, a co-worker or something personal. Would you agree with this? Why do you think this was?

4. I noticed that there seemed to be areas within the nursing unit that were more social, and areas that were more quiet. Would you agree with this? Would you tend to go to certain areas when you wanted to interact with other staff, and go to other areas when you need a quiet space to work?

5. I noticed that certain staff seemed to always work in certain areas of the unit, such as NP's, PA's, and AH. Would you agree with this? Were these staff members assigned to these areas? Would the location of certain staff affect where you chose to work?

6. I noticed that many of the nurses chose to eat lunch in the breakroom, and that this was often a place for socializing and venting. On another unit that we observed there was very little use of the breakroom. Why do you think the breakroom was used so frequently by the staff on your unit? Also, it usually seemed to only be RN's and nursing aides who ate there. Would you agree? Why do you think this was?

7. I noticed that staff would often discuss patient care directly outside the patient room, as it was a space where many different caregivers paths would cross. Would you agree? By discussing patient care in this corridor space, there

seemed to be limited privacy. Did this affect your ability to discuss patient care openly and effectively?

Space & Layout:

    a. Where was the best place to talk about X with 1) other RNs; 2) Drs; 3) AH
         i. specific procedures you were not sure about
        ii. verification of medications
      iii. patient care plan/patient status
      iv. socializing/emotionally venting
       v. teaching or providing advice

    b. Were you ever uncomfortable discussing certain issues because there was no appropriate place to do so?

    c. Is there anything about the culture – formal or informal values/expectations - of the unit that would make it more or less likely to ask for or offer information, knowledge or experience?

    d. How do you think the physical layout (the kind of space available and how it is organized and designed) affects teamwork among staff members? What about the culture?

    e. If you could change aspects of the layout or physical design of your unit that would improve your work experience (communication, efficiency, walking time, etc), what would you change?

Verification and advice:
1. I noticed that you often asked your orientor to verify your medications? Can you tell me about his process? For example, are there certain medications that must be verified? Could you ask any nurse to verify, or were you required to ask your orientor?

2. I noticed that your orientor worked very closely with you, especially at the beginning of your orientation, providing clinical guidance and verification. Why didn't you ask other nurses more for advice? How did this affect the speed at which you gained competency?

3. I noticed that you rarely approached a doctor for verification or clinical advice. Would you agree? If so, why do you think this was the case? How did this affect gaining competency?

4. Where would you go for the 2hr learning sessions? Was there appropriate space? How did these help you to learn?

5. What were the best aids for helping you learn and gain competency? Physical layout, culture etc.

Stress:
1. During your regular shift, what did you find to be the most stressful? How did you deal with those stressful situations?
    a. Did the layout or design of the unit affect your stress level and your ability to deal with those situations? If so, how?

    b. Did the culture (social and professional relations among the people working on the floor and how people generally interact and communicate) of the unit affect your stress level and your ability to deal with those situations? If so, how?

    c. Did staffing levels affect the amount of stress you experienced? If yes, how so?

2. Has the change in Nurse Manager and Charge Nurse had an affect on the stress level of the unit? If so, in what way?

3. Does the current patient:nurse ratio have an affect on the stress level of the unit? If so, in what way?

4. There appears to be relatively low turnover on 4S, would you agree? Why do you think this is? How does this affect your stress? Ability to learn?

Technology:

1. What are the computers used for by both nurses and doctors?
2. When there are problems with a computer, is there an IT support service?
    a. If so, how effective is it?

3. When was the Hil-Rom system implemented?
    a. Was there training for the system?
    b. How effective is it?
    c. Do you use it? How often?

4. How long has this unit been using the Pyxis for medication?
    a. How effective is it?
    b. Is there a tech support service for the Pyxis

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