

Nursing Unit Design and Communication Patterns: What Is “Real” Work?

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Abstract

While considerable attention has been paid to how the design of nursing units can help reduce nurse fatigue, improve safety, and reduce nosocomial infection rates, much less attention has been paid to how nursing unit design influences informal communication patterns, on-the-job learning, and job stress and satisfaction. Yet the literature consistently cites communication among diverse care-givers as a critical component for improving quality of care. This paper reviews relevant literature related to nursing unit design and communication patterns, and suggests an evidence-based design research agenda grounded in the concept of “organizational ecology” for increasing our understanding of how hospital design can contribute to improved quality of care.

Key Words

Evidence-based design, physical design, communication, job stress, nurses

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The construction boom in hospitals in the United States is well documented. With over \$38 billion spent on new hospital construction in 2006 (Romano, 2007), and driven by the need to replace hospitals made obsolete by advances in medical and information technology, pharmacology, changing models of service delivery, changing patient demographics, fierce competition among health systems, and rising consumer expectations, the key question becomes where best to invest in new facilities to obtain what the British like to call “value for money.”

Given the shortage of nurses, which will only worsen as today’s nurses (whose average age is 47) retire over the next 10 to 15 years (Joint Commission, 2002), attention has been given to how the design of nursing units can help in the recruitment and retention of nurses, in part by reducing the fatigue associated with walking extensively during shifts (Joseph, 2006) and by improving nurses’ health and safety. Examples of new approaches to the design of nursing units include increased attention to

- how floor materials can reduce falls,
- how patient lifts can reduce back injuries,
- how information technology can make access to patient information available in multiple, decentralized locations simultaneously, and
- how single rooms can help reduce nosocomial infection.

All of these respond to mounting concern regarding the quality of the hospital environment not only for patients, but also for frontline staff (Ulrich et.al., 2004).

The recognition that delivery of “patient-centered care” requires equal attention to “staff-centered care” —because both are, in fact, part of the same ecological system—raises the question, “How does the physical design of hospitals contribute to improved quality of care by working on multiple levels in a synergistic fashion?” This paper argues that assessing nursing unit design deserves more attention, not only because of its potential to reduce fatigue and increase visual access to patients, but because of its potential to encourage informal and opportunistic communication.

Communication, Interaction, and Quality of Care

At a time when there is both an acute nursing shortage and great concern about the quality of care delivered to patients, it is critically important to explore ways that nurses’ work environments, including their physical design, can improve how nurses interact and communicate with each other and with caregivers, particularly doctors. Communication patterns that may contribute to job stress, job satisfaction, and quality of care should also be studied. In Australia, inadequate communication has been associated with 17% of system problems; of these, 84% were deemed potentially preventable. About 50% of all adverse events detected by general practitioners were associated with communication

difficulties. In intensive care units, only 2% of the activity consists of verbal communication between nurses and doctors, but it accounts for 37% of all error reports (Coiera et al., 2002). Thus, the evidence strongly suggests that poor communication wastes time, threatens patient care, and may be one of the chief culprits behind preventable adverse events in clinical practice.

The role of communication in healthcare teams is particularly important, and in both the United States and the United Kingdom (U.K.) the development of multidisciplinary teams has been identified as a critical component for improving the quality of healthcare. A national study of care teams in the U.K. noted that “The best and most cost-effective outcomes for patients and clients are achieved when professionals work together, learn together, engage in clinical audit of outcomes together, and generate innovation to ensure progress in practice and service” (Borrill et al., 2001, p. 27). Much of this communication is, in fact, informal, unplanned, and opportunistic.

Teamwork in the Hospital Context

The benefit of teams and the effective communication patterns that underlie them take many forms. Kalisch and Begeny (2005) cite the benefits of nurse-physician and interdisciplinary teams, including meeting the complex needs of patients (Mickan & Rodger, 2000), improving patient care (Kaissi, Johnson, & Kirschbaum, 2003; Liedtka & Whitten, 1997), increasing staff satisfaction and organizational effectiveness (Horak, Guarino, Knight, & Kweder, 1991), and strengthening overall healthcare delivery (Wood, Farrow, & Elliot, 1994). Rafferty,

Ball, and Aiken (2001) found that nurses who reported a higher level of teamwork were more satisfied with their jobs, planned to stay in them, and were likely to have a lower burnout score. While such research clearly demonstrates the importance of communication for improving quality of care and staff satisfaction, relatively little attention has been paid to the design of hospitals or how the design of nursing units affects informal and opportunistic interaction patterns and their contribution to informal learning and quality of care.

What Is “Real Work”?

One reason less attention has been paid to the impact of nursing unit design on communication than to the influence of design on, for example, walking distance or staff health and safety may be the perception—carried over from the corporate setting—that conversation is “socializing” and therefore not a work-related activity. We can thank Frederick Taylor and the *Principles of Scientific Management* (1911) for that notion. It was Taylor who, in the name of efficiency, broke down complex tasks into discrete, repetitive activities that could be done quickly by people with little training or skill (and consequently be paid lower wages). It was also Taylor who, reflecting the values and views of his time, viewed most workers as inherently lazy, thereby creating a need for constant surveillance and strict management control. From this climate emerged a management view that socializing was a waste of (the corporation’s) time. Being “on task” was what counted. However, as Becker and Sims (2001, p. 3) write: “Yet if you look at pictures of offices in the early part of this century, what you see

are people interacting: partners across their double-wide desk; managers in their shared closed office; supervisors and staff together in a large room without dividing panels or barriers. In effect, what you see are in many ways the kinds of team-oriented offices we strive for today, albeit far less tidy and comfortable and with far more paper.”

Frequent, short, “on-the-fly” conversations in corridors, around nursing stations, and in break and med rooms are also seen in today’s hospitals. Despite the view that new information technologies make this informal, opportunistic, face-to-face conversation anachronistic, research suggests otherwise. In a series of studies done at The Centre for Health Informatics at the University of New South Wales in Sydney, research examining the actual patterns of communication among clinical staff clearly demonstrates that people prefer to turn to each other for information and decision support (Coiera & Tombs, 1998; Parker & Coiera, 2000). Tang et al. (1996) found that about 60% of clinician time in clinics is devoted to conversations with other staff members. Safran et al. (1998), reviewing the information transactions in a hospital with a mature computer-based record system, found that about 50% of information transactions still occurred face to face between colleagues. In a similar study Coiera and Tombs (1998) observed the communication patterns of eight physicians and two nurses in an English district general hospital. The available channels of communication were face-to-face meetings, both impromptu and planned; desktop telephones; paging; written notes for colleagues in patient notes; notes at ward desks; notice

boards; and pigeon holes for personal memos. The subjects in this study made little or no use of more formal sources of information, with the exception of data from the medical record. During the study, staff almost always favored face-to-face discussion over other methods.

These and other studies suggest that, irrespective of the presence of electronic communication systems, it is by means of a multitude of conversations that occur throughout the day that clinicians present, examine, and interpret clinical data and ultimately decide on clinical actions. In contrast to the computational view of decision support, these studies indicate that the dominant preference of medical staff is informal, face-to-face communication with colleagues. In effect, the greatest information repository in health care resides in the people who work in it; and the greatest information network is the web of conversations that link the actions of these individuals (Coiera, 2000). From this network of personal relationships come cooperation and trust, which form the social capital that in turn supplies community (team) members with the “resources” (e.g., information, support, and training) they need to learn and perform their jobs well (Becker, 2006).

Unplanned Communication and Communities of Practice

The role of interpersonal communication in informal, opportunistic, on-the-job learning can be understood in the context of the communities-of-practice framework, which focuses on knowledge-sharing across informal networks of

people who have a common interest or task (Lave & Wenger, 1991). The communities-of-practice concept emerged from ethnographic analysis of how groups actually work and communicate in practice. For example, Brown & Duguid (1991) found that customer support staff learned the tricks of their trade not by attending formal training sessions or reading company manuals, but by drawing on the experience and insights of others with whom they worked. Knowing whom to contact and getting good information required developing relationships with a wide range of people who performed the same kind of work. In such a setting learning through participation rather than through more passive means of acquiring knowledge is the primary mode by which to master the skills and knowledge necessary to become competent members of a team (Lesser & Prusak, 2000). Informal communication also plays an important role in co-worker relationships, which in turn affect work effectiveness and commitment. Feldman (1988) discovered that employees found it easier to access information and solicit feedback from team members once they were trusted members of the team.

Barriers to Effective Teams and Communication

A number of factors that create barriers to effective teamwork and communication between different professional groups, such as doctors and nurses, have been identified (West & Pillinger, 1996). Gender is one such factor. Doctors are predominantly men, while the remaining healthcare service

professions are mainly composed of women. Education is another issue. There is great variation in the educational background and training of professionals such as doctors, nurses, physical therapists, nutritionists, pharmacists, and social workers. These differences translate into perceived status differences that influence the nature and frequency of communication across disciplines and the experience of working in teams (Iedema et. al., 2005). Additional factors identified as barriers to effective teamwork include large team size, instability of the workforce and assignments, the absence of a common purpose, and *inhibiting physical environment* (italics added) (Kalisch et al., 2005).

The Physical Environment, Teams, and Communication

To date, the effect of the physical environment (e.g., lack of space and cramped spaces, design and layout of work stations and corridors) on communication patterns—particularly informal communication—has received little attention.

While poor physical design may constitute a barrier to teamwork and communication, good design of the physical environment can be viewed as an opportunity to overcome the kind of social and organizational barriers often discussed in the literature (Becker & Kelley, in press). For example, when work processes benefit from a better understanding of others' skills and knowledge and a free exchange of information and opinions, more open work areas with a high degree of visual contact have been shown to be more effective than more closed-in offices and workspaces (Becker & Sims, 2001).

Organizational Ecology and Communities of Practice

Organizational ecology conceptualizes the workplace as a system in which physical design factors both shape and are shaped by work processes, an organization's culture (e.g., formal and informal values, norms, expectations, policies, and practices), patient characteristics, workforce demographics, and medical and information technologies (Becker & Steele, 1995; Becker 2004, 2007). Within this ecological system, informal learning and the active give and take among people from different disciplines contribute to the development of a community of practice (Brown & Duguid, 1991; Lave & Wenger, 1991) that is characterized by the active sharing of information, insight, and skills among team members who are bonded by informal relationships, similar work roles, and a shared organizational context. Communication typically involves work-related information and knowledge (from technical skills to organizational culture) and person-related information (understanding the skills, abilities, and work styles of one's own team members) (Becker, 2007).

In a study of a 1,860-bed acute-care general hospital in Hong Kong, Gilleard and Tarcisius (2003) describe the potential of a medical unit's physical design to transform how a multidisciplinary care team interacts informally. They found that introducing alternative workplace strategies to a pediatric ward of doctors and allied health professionals (e.g., clinical psychologists, physiotherapists, social workers, and dietitians) significantly improved communication patterns, helped resolve conflict, increased cooperation, and produced higher-quality service from

the patients' perspective. Of particular relevance is that, because specialists were no longer physically isolated, the transfer of knowledge, both tacit and explicit, became easier. Clinical judgments formerly confined within the boundaries of medical disciplines became more holistic. Communication among the various disciplines and with patients was also enhanced. Information about the social background of patients and their families, which was discovered to be important in formulating rehabilitation plans, was more easily incorporated into discussions and treatment plans. Improved communication increased mutual trust, making it easier to resolve conflicts immediately through compromise and collaboration.

Health Facilities Research at Cornell

The International Workplace Studies Program (IWSP) in the College of Human Ecology at Cornell University has been a leader in the study of innovative integrated workplace strategies for almost two decades. Its focus has been on how the planning, design, and management of the corporate workplace affect individual, team, and organizational performance. In 2003 the IWSP shifted its focus to the planning and design of health facilities. Bridging the earlier work and current research on health and design is a continued focus on how ecological factors such as the design, layout, and spatial use patterns of a medical unit influence the effectiveness of patient care teams. In particular, our aim has been to investigate the influence of the physical environment of medical units on

informal, opportunistic communication patterns among members of different professions on patient care teams and its relationship to the quality of care.

Research that is just being completed, for example, has examined the impact of centralized and hybrid ICU nursing unit designs on the communication and interaction patterns of the patient care team. In particular, we were interested in whether the same nursing team's interaction patterns changed when, following a major renovation, they moved from what we called a "multi-hub" centralized unit design to a nursing unit design we describe as a hybrid: that is, a floor composed of a series of proximate pods distributed around the ICU unit.

Our interest in the effect of nursing unit design on interaction patterns stems from the fact that decentralized pods seem to have become "best practice" in current nursing unit design, although there is little systematic research confirming that they are used by nurses as intended. Nor has their influence on communication and interaction patterns (as opposed to improving patient observability or reduced nurse walking time and fatigue) been considered. Given the amount of money invested in new hospital construction and major renovations, we believe a key role for academic researchers is to challenge and test such emerging design directions. Do they accomplish what they were intended to do? Are there unintended consequences—positive or negative—of new designs? Over time, such research builds the knowledge base for evidence-based design that has the potential to improve quality of care.

In the case of whether nursing unit design influences interaction patterns, our preliminary data suggest that the new, more decentralized unit has significantly decreased the frequency of interaction among nurses, and between nurses and doctors. While the duration of all interactions was very short in both the old and new units, there were fewer longer interactions after moving to the new unit. In focused interviews nurses talked about feeling more isolated. We have also collected data on job satisfaction and job stress in an effort to better understand how communication patterns might affect staff. At the time of this writing, these data had not yet been analyzed.

A Research Agenda

This initial study has deepened our interest in the organizational ecology of the nursing unit, and it is helping to shape a long-term research agenda focused on how nursing unit design affects communication and interaction patterns as well as opportunities for informal, opportunistic, on-the-job learning. We also want to study how such interaction may affect job satisfaction, job stress, and, ultimately, the quality of care.

An important element of this emerging research agenda is the development of a nursing unit typology. What constitutes a “centralized,” “decentralized,” “hybrid,” “multi-hub,” or other type of unit? Without a consistent typology that can be used to categorize different nursing units within and across hospitals, it is difficult to

build a comparative research literature. Our goal is to repeat and extend our studies of interaction patterns to medical units that differ in both type of service and design. This will enable us, over time, to determine whether the effects we find in any one setting, or in one type of medical unit, are robust and consistent.

Given the organizational ecology framework, it is also important to develop consistent ways to capture and categorize other aspects of the ecological system, such as the technology infrastructure, organizational culture, staffing patterns, work processes, and workforce demographics that interact with physical design to generate measurable outcomes. With this information one can begin to develop a more nuanced organizational profile that reflects an organizational *system* rather than, as typically occurs, focusing on only a single facet of the total system (e.g., physical design, technology, staffing, organizational culture, or management). This makes research more complex, but it also creates the potential to understand and develop what we've called elsewhere "integrated workplace strategies" (Becker and Steele, 1995; Becker, 2004). These recognize that we experience the workplace as a set of interdependent relationships. How space is used is affected by management style and organizational culture, by available technology, and by the age and nature of the workforce. The flip side, of course, is that the effect of factors such as new management policies and practices, organizational values and informal norms, and expectations are influenced by physical design.

With this ecological perspective, we are beginning to explore how the stress and distress that new nurses experience in the first three to six months of their careers (Fisher and Connelly, 1989) could be mitigated. In large part this stress is fueled by the fear that they do not know enough and could commit an error (Casey et al., 2004). We want to explore whether new nurses' stress is lessened when, as part of their regular shift work, they are able to work on nursing units whose physical design increases on-the-job opportunities to interact and learn from more experienced nurses (Maiocco, 2003).

To study how we can speed up skill development and instill confidence, we are starting a new project in which, during the first three months of their employment, we will track new nurses, some of whom are assigned to units with different physical designs. Over the course of the three months, which constitute the new nurses' orientation period, we will measure interaction patterns with other staff, stress levels, and job satisfaction. The key outcome measure, "speed to competency," is used regularly by the hospital where the study is being conducted to determine when a new nurse is deemed ready to work independently. Competency is of vital importance because it directly impacts how nursing units can be staffed as well as the quality of care delivered.

In conclusion, we've chosen to focus our research on an aspect of nurses' work—communication and interaction patterns-- that is, somewhat paradoxically, deemed to be of fundamental importance, but it is often overlooked in attempts to

grapple with urgent issues ranging from nurse recruitment and retention to improving teamwork and collaboration, to maximizing the quality of care at the bedside. Communication is, without a doubt, “real work.” Therefore we need to understand better the ways in which the design of medical units, in conjunction with other social and technological factors, can increase opportunities to build trust, share knowledge, negotiate diagnosis and treatment plans, speed skill development, reduce stress, increase job satisfaction, and contribute to more effective healthcare teams.

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