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Nursing Intellectual Capital: A Theoretical Approach for Analyzing Nursing Productivity

Executive Summary

- ▶ The pressure for increasing productivity in the context of a nursing shortage has surfaced the need to measure nursing productivity with more sophisticated tools.
- ▶ The author has outlined a framework for assessing nursing productivity that includes the "contribution of nursing knowledge and skill, and factors such as organizational trust and commitment."
- ▶ This framework includes nursing knowledge indicators such as educational preparation, experience, career development, autonomy, organizational trust and commitment, and employee satisfaction.
- ▶ The model also includes nursing productivity indicators such as direct care hours, turnover, absenteeism, orientation and education, nursing errors, and patient satisfaction.
- ▶ Results of this study are expected to assist organizations in refining their ability to recruit, develop, and maintain the most effective nursing workforce.

GOVERNMENT INITIATIVES throughout the past decade redirected resources earmarked for health service delivery. This prompted health care administrators to engage in large-scale restructuring designed to demonstrate fiscal accountability. Many restructuring initiatives resulted in recommendations to change the way nursing care is provided. Examples include retraining, redeploying, or reducing professional nursing resources. When making these recommendations, nurse leaders have limited reliable information on cost and productivity indicators for nursing and how these relate to patient care. Concerns have emerged that patient safety may be jeopardized as efforts to restructure patient care continue. Little attention has been paid to ensuring the strategies used to reduce nursing costs have been effective, and the mechanisms used to determine nursing productivity are accurate and valid. As well, little or no consideration has been given to the contribution that professional nursing knowledge and intellectual capital provide to productivity. A framework for examining productivity in nursing that incorporates knowledge and skill and uses preliminary data from a

pilot study conducted in Canada to verify the dimensions of the model is presented.

In today's society, total factor productivity has become synonymous with the viability and success of an organization. This is particularly important in health care where the very survival of the health care system may rely on the productivity of those who work within it. It is well recognized that nursing represents a large labor source within the health care system. At a time following substantial health service restructuring, patients not requiring hospitalization are cared for in ambulatory or home care situations, while those patients remaining in hospital are usually acutely ill with a number of complex needs. Thus it is essential that these patients have access to a nursing staff comprising the best intellectual capital available. At the same time, nurse executives are required to be accountable to their payers, and thus need to have some

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measure for assessing the productivity of the nursing care that is being provided, from the perspective of both the system and the patient.

Nursing Productivity

Within the discipline of nursing, productivity has been described as a measure of the efficiency with which labor, materials, and equipment are converted into goods and services (Edwardson, 1985). Theoretical models that appear to evolve from general systems theory have been used to guide interpretations of nursing productivity as a ratio of outputs to inputs (Edwardson, 1985; Fox, Fox, & Wells, 1999; Jelinek & Dennis, 1976; Van Slyck, 1991). While economic theories of productivity are apparent, their application is often described in relation to inputs and outputs of the system (Edwardson, 1985; Fox et al., 1999; Jelinek & Dennis, 1976; Strasen, 1987; Van Slyck, 1991). Little or no attention has been paid to the role of individual nursing skill and knowledge (nursing intellectual capital), in assessments of nursing productivity. Within the nursing profession periods of nursing shortage continue to be experienced. Nursing positions have been decreased with the restructuring initiatives of the past decade (McGillis Hall, 1997; McGillis Hall, Pink, Johnson, & Schraa, 2000), and investments in nursing such as orientation and ongoing education have declined. These changes may indicate a continued trend to view nursing productivity from the production orientation of inputs and outputs.

Recent studies in the nursing sector suggest that nurses no longer feel their work is valued and nurses are concerned with the quality of care being provided to patients (McGillis Hall, 1999). The restructuring era has left nurses with little sense of organizational loyalty and trust. In a concept analysis of trust, Johns (1996) identified that little attention has been paid to relating trust, the work environment, and

other work-related factors in the nursing literature. She recommends that trust is a key element in realigning flatter organizational structures and redefining nursing work in a dynamic health care environment (Johns, 1996). Trust and morale can erode in work environments with increased workloads and job insecurity (Fisher, 1991). Mishra and Spreitzer (1998) suggest that trust in management and perceptions that downsizing was handled in a justifiable manner can lead to reduced threat and greater cooperation from staff. Responses to downsizing are thought to be influenced by trust, empowerment, as well as work design (Mishra & Spreitzer, 1998). Productivity in nursing may be affected by other factors in the nursing work environment such as trust in the organization. A framework for examining productivity in nursing that includes the contribution of nursing knowledge and skill, and factors such as organizational trust and commitment may be more effective for capturing the context of the work environment in nursing.

Theoretical Underpinnings

Theories of human capital evolving from the field of economics suggest that devoting resources to the education, career development, and orientation of individuals constitutes an investment that will produce future returns for an organization (Flamholtz & Lacey, 1981; Schultz, 1981). The underlying principles of human capital are that individuals possess skills, experience, and knowledge that have an economic value to the organization (Schultz, 1981). Parnes (1984) states that "...human capital embraces the abilities and know-how of men and women that have been acquired at some cost and that can command a price in the labor market because they are useful." Skills and knowledge are considered to be a valuable asset as individuals perform future work

for the organization. The "value added" of these individuals may be direct as seen through a transformation of the work product, or indirect as evidenced through problem-solving behaviors, coordination of the work of several departments, and exercising judgment in variable situations — all concepts that are congruent with nursing work.

Human capital theory implies that an organization can invest in individuals through competitive hiring practices or develop individuals from within. Competitive hiring practices are routinely seen in the health care environment during nursing shortages as nurses are offered options such as sign-on bonuses or reimbursement for relocation. Ongoing investments to continuously develop nursing staff from within organizations have been less evident. Human capital is important to the labor market because it is considered to be of value to other organizations as the skills and knowledge embodied in the individual are transferable (Parnes, 1984). The challenge lies with retention and the costs associated with retaining and motivating staff (Flamholtz & Lacey, 1981).

Economic labor theories suggest that the structure of labor inputs as well as their total amount affect the price or cost of that labor (DeBrizzi, 1983; Fine, 1998; Mohun, 1984; Wunderlin, 1992). Human capital combines with the structural labor inputs within an organization to create intellectual capital (Edvinsson & Malone, 1997). As well, intellectual capital can be seen as a combination of individual characteristics, education, experience, and attitudes (Hudson, 1993). Since individuals differ in intelligence, skills, motivation, and personality, it is essential that organizations determine what qualities are desirable in recruiting new staff, and what ongoing educational and career development programs should be provided to them to ensure they are functioning in a productive capaci-

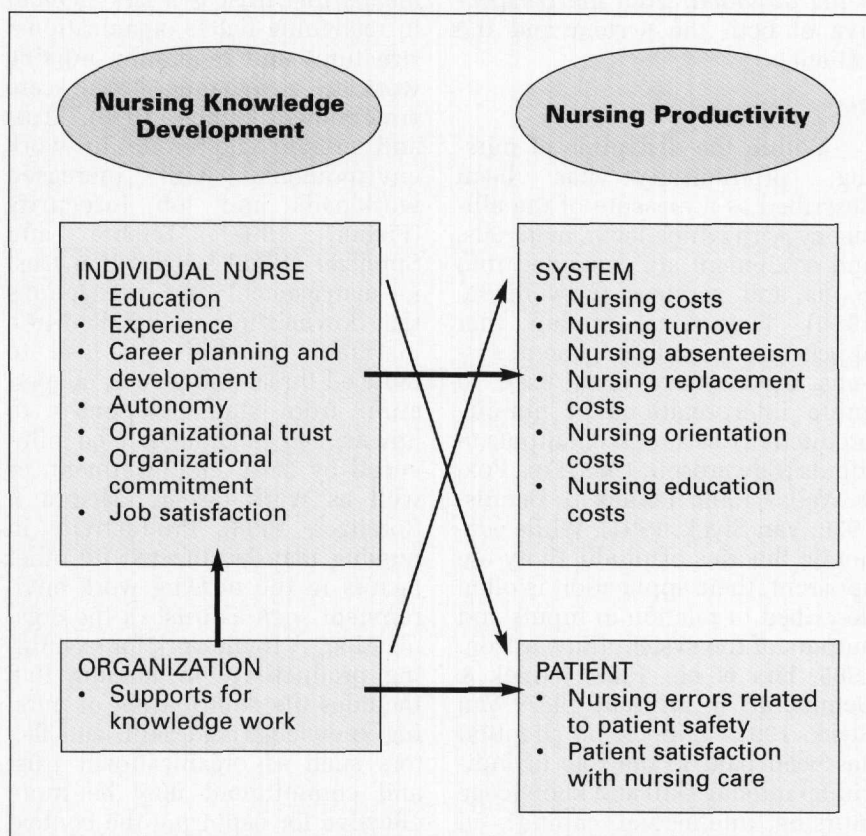
ty in the organization. Initiatives that demonstrate an interest in staff development will generate employee trust in the organization.

Knowledge as a Resource

Drucker (1993) suggests that knowledge is the basic means of production in current organizations. The resource of knowledge has been recognized as the pre-eminent economic resource in successful organizations (Stewart, 1999) and effective knowledge creation depends on a number of activities existing within an organization designed to enable knowledge development in staff (Von Krogh, Ichijo, & Nonaka, 2000). The concept of the knowledge-intense workplace staffed by a workforce comprising knowledge workers appears to fit well with the health care environment, and specifically the nursing profession (Grantham, Nichols, & Schonberner, 1997; Sorrells-Jones & Weaver, 1999).

Health care organizations today are experiencing unparalleled change in both their structure and their processes of care delivery. Preparing nurses, the largest employee group in most health care organizations, to anticipate and respond to organizational change and enabling them to take greater responsibility for their career goals is critical to maintaining organizational viability. Regardless of whether change is planned or unplanned, initiated by the employee or the employer, there are many factors that influence a nurse's ability to thrive on the opportunities created, growing with and being productive with change, rather than merely reacting to it. Ongoing education and career development can offer nurses the means to respond to both short and long-term changes in their profession and in the health care system. Valued career-oriented nurses are more likely to be productive and safe practitioners that stay within an organization, thereby producing the long-term investment of human capital. Theoretically, if a human

Figure 1.
A Conceptual Model for Nursing Intellectual Capital



capital approach were applied to the nursing labor market, it is feasible that the cyclical nature of nursing shortages could be controlled. The theoretical model proposed is presented in Figure 1.

Conceptual Framework

“Nursing knowledge indicators” are aimed at identifying individual nurse characteristics that may be expected to affect the productivity of care provided by nurses. “Nursing productivity indicators” focus on how the health care system and patients are affected by their interaction with individual nursing staff. The nursing knowledge indicators proposed relate to: educational preparation, experience, ongoing education, career planning and development stage, satisfaction, autonomy, organizational trust, and commitment. The

nursing productivity variables related to the system include nursing costs, turnover, absenteeism, absence replacement costs, orientation costs, and education costs; while those related to the patient include nursing errors related to patient safety-medication errors, urinary tract infections, equipment, and patient satisfaction. Definitional statements developed for each of these variables are presented in Table 1.

Application of the Model

As part of a research program examining nurse staffing models and the nursing work environment in Ontario, Canada, this new model for measuring nursing productivity has been developed and is currently being pilot tested by evaluating productivity in relationship to outcomes for the system and the

Table 1.
A Theoretical Approach for Analyzing Nursing Productivity

Nursing Knowledge Indicators	
Educational Preparation	A measure of the type of educational preparation that each registered nurse has obtained (for example, graduate degree, baccalaureate, diploma, other).
Experience	A measure of the experience level that each registered nurse has obtained (for example, years of experience in nursing, in this setting, and in this area/unit).
Career Planning and Development	A measure of the activities that each registered nurse has undertaken related to career planning.
Autonomy	A measure of registered nurse perceptions of the level of autonomy they have in their work and their work environment.
Organizational Trust	A measure of registered nurses' interpersonal trust at work with the work setting.
Organizational Commitment	A measure of registered nurses' acceptance of the organization's goals and values, readiness to exert effort on behalf of the organization, and desire to remain a member of the organization (Mowday, Steers, & Porter, 1979).
Satisfaction	A measure of registered nurse satisfaction with specific facets of their work.
Nursing Productivity Indicators	
<i>System</i>	
Nursing Costs	Percent of total nursing earned hours utilized for direct nursing care.
Turnover	The number of vacant positions per unit/monthly divided by the number of positions.
Absenteeism	Percent nursing staff hours utilized for absenteeism.
Orientation Costs	Percent nursing staff hours utilized for orientation.
Education Costs	Percent nursing staff hours utilized for ongoing education.
<i>Patient</i>	
Nursing Errors Related to Patient Safety	Monthly rates for medication errors, nosocomial infections, and equipment failures that relate to nursing care.
Patient Satisfaction	A measure of patient satisfaction with nursing care.

patient. Specifically, this study investigates the type of mechanisms used to measure nursing productivity in Ontario (the quantity of nursing inputs: the mix of nursing labor, nursing cost per weighted case) and the structures in place in health care organiza-

tions to promote the development of knowledge work in nursing (ongoing education programs offered, support for education, evidence of learning organization principles). Along with this, indicators for assessing nursing intellectual capital as a measure of

nursing productivity are being validated and tested.

In the first phase of the research, the following research questions were examined: (a) what are the mechanisms currently used to measure nursing productivity in a sample of Ontario community

agencies? and (b) what are the individual strategies and efforts employed by these organizations to enhance the knowledge development of nurses? The findings from the initial stage of research were verified in consultations with key stakeholders aimed at determining the knowledge and skill requirements of nurses that community organizations need to invest in to create a productive nursing workforce, and to verify indicators of human capital investment that can be linked to nursing productivity in these settings.

Mechanisms currently employed to measure nursing productivity. Preliminary findings from the pilot study indicate that in the community nursing environment, nursing costs are measured in relation to actual expenditures for nursing salaries as well as the amount of time nurses spend on an average client visit, and the amount of time in a given day that is spent on direct client care. This suggests that measures of nursing productivity must go beyond simple calculations such as salary costs, to include needs-based approaches that relate to the type of client being cared for, and the time required to meet the client's individual care requirements.

Knowledge development strategies employed. Community organizations appear to differ in the knowledge development strategies they employ. Provider agencies have minimal educational requirements for work, such as diploma registered nurse status, and current certification in cardiopulmonary resuscitation. However, a 2-day on-site orientation is provided by some agencies for specialty work such as pediatrics, followed by preceptorship for a period of up to 1 month. Support for ongoing education is evident in a variety of ways such as funding to attend conferences, time off to attend educational sessions, organization of on-site educational programs and inservices, and paid meeting time.

In contrast, the brokers or con-

tractors of these agencies do not appear to set explicit expectations regarding educational requirements for nurses. The requirements for education are left to the community organizations to determine, although the contractors indicate that nursing personnel should have specialized training, knowledge, and ability to meet the needs of the clients. As well, minimal certification for licensure is required.

Verification of the model. The indicators identified in the pilot work relate to the knowledge and skill of professional nurses as identified in the proposed theoretical framework (level of education attained, continuing career development, ongoing educational pursuits), all of which represent components of human capital theory. The relationship between the proposed nursing knowledge indicators, as well as perceptions of autonomy, satisfaction with work, organizational trust, and organizational commitment, and nursing productivity indicators that relate to the system (actual nursing costs incurred by an organization), and the patient (patient safety indicators and patient satisfaction) is currently being explored in a longitudinal study.

Implications

The results of this research will address an important gap in the literature and practice environment on productivity and costing in nursing. This research is expected to develop and test a theoretical model for examining productivity in nursing that is more relevant to society today. The impact of individual nursing capital on productivity (nursing system costs, patient safety, and satisfaction) will have been examined and tested. This research has three unique and specific contributions to offer: (a) previous studies have looked at nursing productivity from the perspective of inputs and outputs; but none have considered nursing productivity in the context of the

knowledge and skills inherent in professional nursing practice; (b) it is the first attempt to develop a theoretical model for examining productivity in nursing; and (c) to date there has been little or no examination of the knowledge and skill required to produce effective, safe nursing capital in Canada.

The development of a more comprehensive and realistic approach to analyzing nursing productivity will serve a number of purposes. First, it will be useful for health care organizations wishing to compare information about the effectiveness of nursing resources, and the outcomes of nursing resource use for the patient and the system. Further, it will assist health care leaders to improve the care they provide and guide decisions regarding the skills and competencies required within the nursing staff mix. By measuring the same indicators across organizations, health care settings will have the opportunity to identify and replicate areas of excellence and generalizability of the results will be enhanced.

Conclusion

To maintain and improve the quality of work life experienced by professional nurses requires that nurses be more skilled and more productive in their work settings. To enable this to occur, frameworks that promote concepts such as knowledge development are essential. The future of nursing depends on the knowledge and skill of the nursing workforce and the availability of adequate numbers of nurses for the health care sector. Similarly, the safety and health of society will be affected by accessibility to nursing personnel who possess such knowledge and skill. This framework goes beyond current approaches to measuring productivity in nursing by examining the social and cultural core of nursing, and reframing productivity in relation to the knowledge, skill, and competency embodied in the discipline of nursing. It involves a rethinking and reformulation of the

concept of productivity in nursing and expands knowledge and understanding of the relationships among a productive nursing workforce and the health and safety of patients. Finally, it relates nursing productivity to outcomes.

As we face a nursing shortage, increasing the valuing of the nursing profession and its work should have a positive effect on recruitment to the profession or at least limit the early exits from the profession. Changes in the workplace require nurse executives to develop nursing work environments that demonstrate trust and value in the individual. Adapting a human capital approach that emphasizes the knowledge and skill development of nurses, provides evidence to nurses that they can trust in the organization and its leadership to value nurses' contributions to the patient care process. This is of importance to health service organizations and administrators who must address "the bottom line" issues related to nursing productivity on a daily basis since retention might be increased once a better understanding exists of better ways to "incent" (provide incentives for) nurses. \$

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Hospital Mergers in the Early 1990s Focused on Reducing Nursing Hours

Numerous hospitals merged during the 1980s and 1990s in an effort to strengthen their financial positions. A study of hospital mergers during 1983-1988 and 1989-1996 found that the three primary reasons for hospital mergers during both periods were to strengthen financial position, achieve operating efficiencies, and consolidate services.

Hospitals that merged with other hospitals that offered similar services during the later period reduced full-time nursing positions more frequently than comparable mergers in the earlier period (58% vs. 27%), and they did not fill this void with increased use of part-time staffing as occurred in hospitals that merged earlier (29% vs. 60%). Reductions in administrative staff were almost universal, involving about 90% of merging hospitals.

More details are in "Hospital Reorganization and Restructuring Achieved Through Merger," by Bazzoli and colleagues in *Health Care Management Review* 27(1), 7-20.

