

## Using NANDA, NIC, and NOC (NNN) Language for Clinical Reasoning With the Outcome-Present State-Test (OPT) Model

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### **Abstract:**

**PURPOSE.** To analyze the degree to which standardized nursing language was used by baccalaureate nursing students completing Outcome-Present State-Test (OPT) model worksheets in a clinical practicum.

**METHODS.** A scoring instrument was developed and 100 worksheets were retrospectively analyzed.

**FINDINGS.** NANDA nursing diagnoses were correctly stated in 92% of the OPT models. Nursing Outcomes Classification (NOC) outcomes were explicitly stated in 22%, and implied in 72%. Interventions matched appropriate Nursing Interventions Classification (NIC) activities in 61%.

**CONCLUSIONS.** NANDA, NIC, and NOC (NNN) language was used inconsistently by students in this sample.

**IMPLICATIONS FOR PRACTICE.** If NNN language is to advance nursing knowledge, its promotion, representation in curriculum development, and active use is necessary. Educational research is needed on the facilitators and barriers to NNN language use.

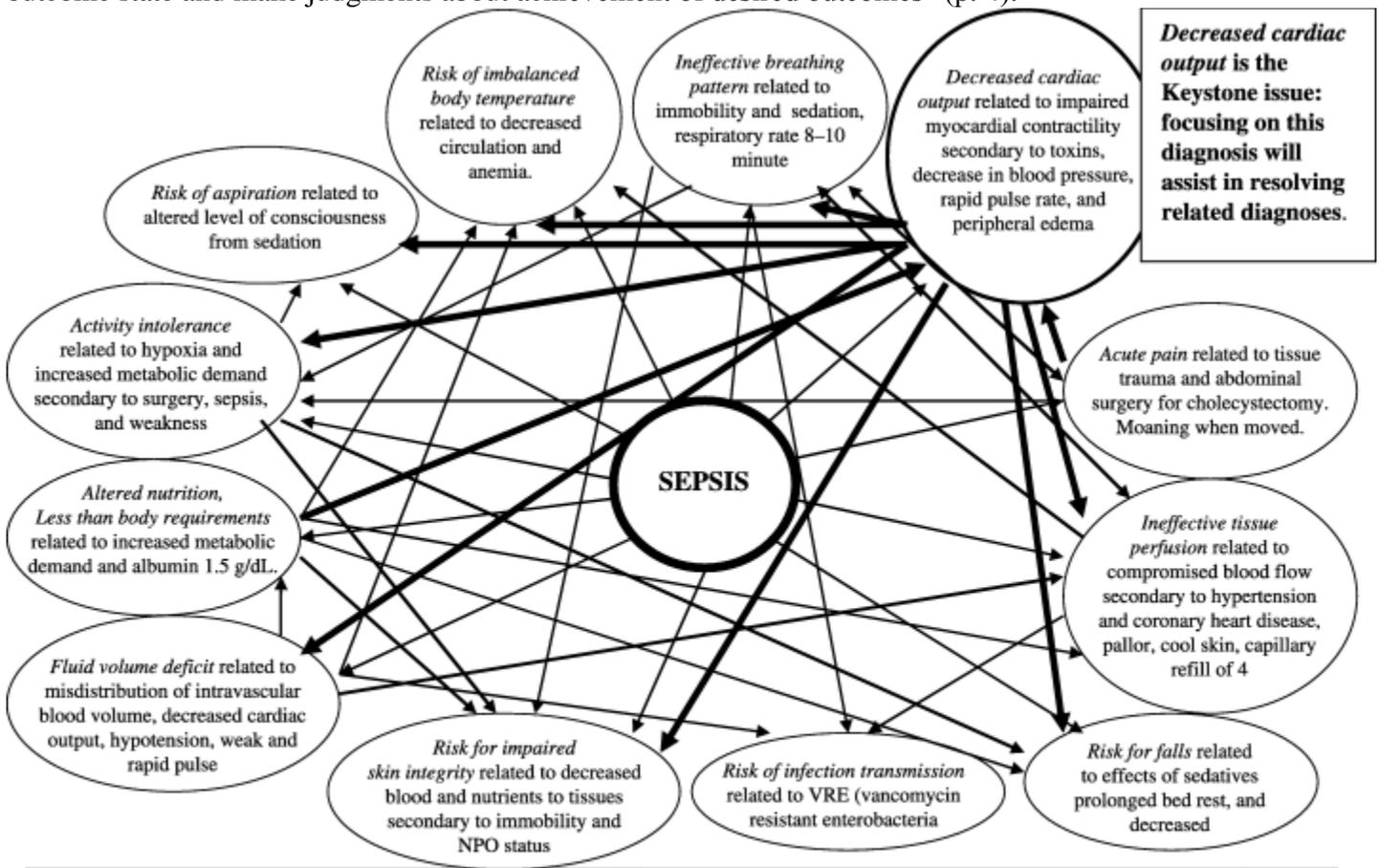
### **Article:**

#### **Introduction**

Representation and classification of nursing knowledge is an important professional issue. The evolution and development of standardized nursing language has included a systematic program of research over the past 32 years, resulting in significant advancements in nursing knowledge work. The Center for Nursing Classification at the University of Iowa has contributed to the creation of standardized nursing languages that capture nursing interventions (Nursing Interventions Classification [NIC], Dochterman & Bulechek, 2004), and nurse-sensitive outcomes (Nursing Outcomes Classification [NOC], Moorhead, Maas, & Johnson, 2003). When these interventions and outcomes are linked with NANDA diagnoses (NANDA International, 2005), all the standardized nursing language pieces (NANDA, NOC, and NIC or NNN) exist to represent relationships between and among nursing diagnoses, interventions, and outcomes (Johnson et al., 2006). When these languages are used to structure nursing information systems in hospitals and other healthcare organizations, it will be possible to make nursing care and its associated activities and achievement of nursing-sensitive outcomes evident (Lunney, 2006). As vendors of nursing information documentation systems adopt the American Nurses Association (ANA) Nursing Information and Data Set Evaluation Center–approved classification systems, NNN will be used more frequently in practice settings. It is imperative that educators anticipate the adoption and dispersion of standardized nursing language and become more intentional about teaching and using NNN language as a clinical vocabulary that supports students’ clinical reasoning about patient care needs, nursing solutions, and nursing interventions.

This article evaluates students’ use of standardized nursing languages with the Outcome-Present State-Test (OPT) model of clinical reasoning. The OPT model has been described as a third-generation nursing process

model (Pesut & Herman, 1998). Figures 1 and 2 illustrate the structure of the Clinical Reasoning Web and OPT model worksheets completed by a student for a patient with decreased cardiac output related to septic shock. Pesut and Herman (1999) have defined clinical reasoning as “reflective, concurrent, creative, critical thinking processes embedded in practice; used to frame, juxtapose, and test the match between a present state and outcome state and make judgments about achievement of desired outcomes” (p. 4).



This student created the web by putting the major medical problem (sepsis) in the center, identifying all relevant nursing diagnoses, including supporting data for each diagnosis; and connecting related diagnoses with arrows, creating a “web” and leading the student to reason that *decreased cardiac output* was the keystone issue because it was the diagnosis with the most arrows (10): 8 leading away (being caused by *decreased cardiac output*) and 2 leading towards *decreased cardiac output*. The arrows connected to decreased cardiac output are **heavier** to illustrate that this is the keystone issue. Resolving *decreased cardiac output* may also resolve the 10 related diagnoses.

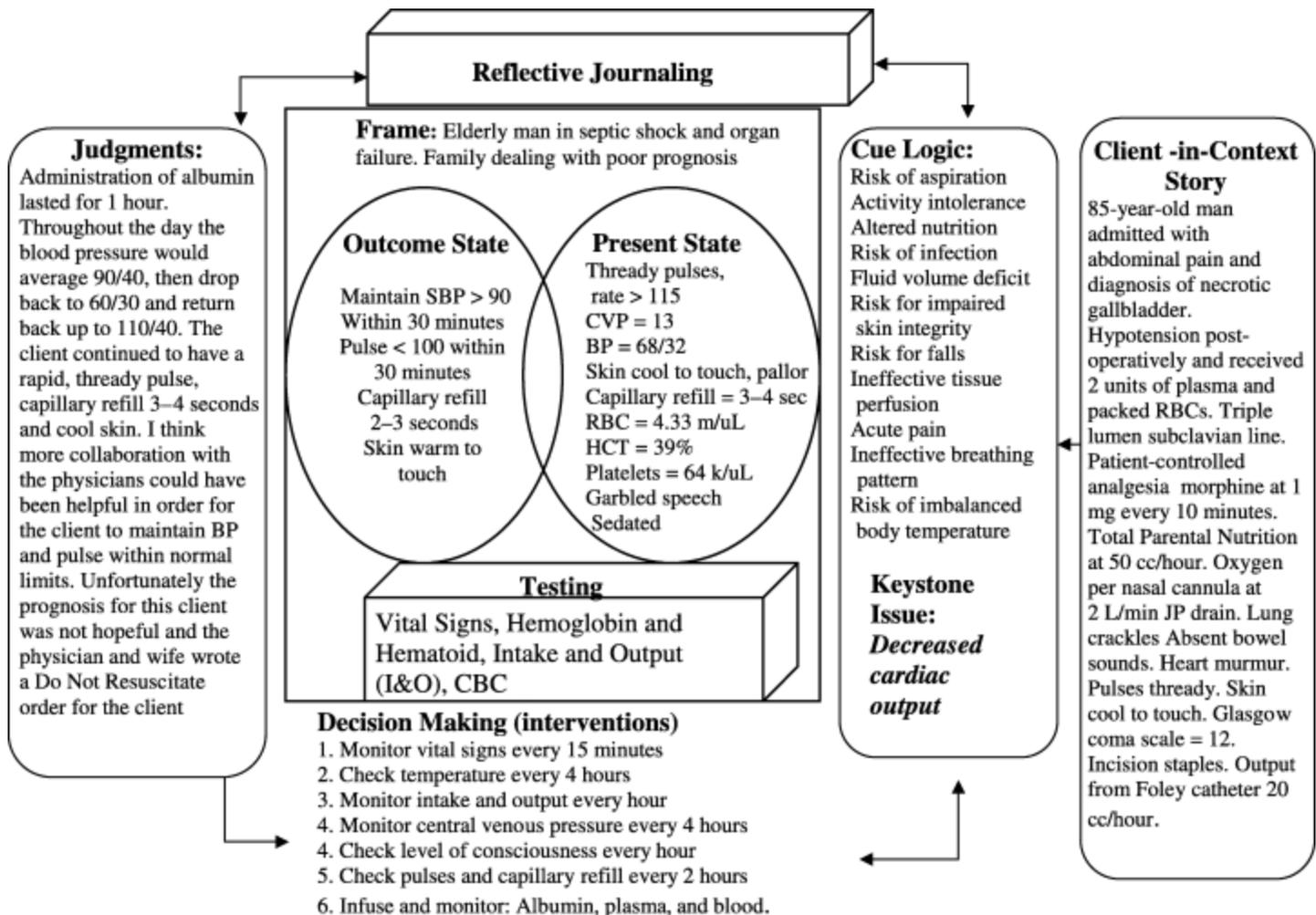


Figure 2. Sample of One Student's OPT Model Worksheet. (This OPT model worksheet corresponds to the Clinical Reasoning Web in Figure 1.)

The OPT model is unique in that the juxtaposition of an identified keystone nursing issue is contrasted with a specified outcome state. The present state is derived from an analysis and synthesis of relationships between and among nursing and client nursing care needs. Several teaching learning strategies support the use of the OPT model as a concurrent information-processing model of clinical reasoning. These strategies include reliance on the patient story, creation of a clinical reasoning web that reveals balancing and reinforcing relationships between and among nursing diagnoses, and the use of a structured OPT model worksheet to organize thinking and reflection on client care issues.

The OPT model provides a conceptual structure for the use of standardized languages. “Present states” in the nursing model can be defined as NANDA nursing diagnoses. Outcomes in the OPT model serve as desired states and can be defined in terms of NOC nursing-sensitive outcomes. NIC interventions are nursing actions that help transition patients from problem states to more desirable outcome states.

Teaching learning strategies associated with application and implementation of the OPT model of clinical reasoning include attention to the OPT structure; the use of NNN content to represent nursing knowledge work; and combining critical, creative, and systems thinking and reasoning skills. The model provides a structure that challenges students to become more conscious of the way they frame and attribute meaning to the facts of the client story. Relationships and associations among competing nursing diagnoses, interventions, and outcomes are emphasized. The model structures the contrast of nursing problems with desired outcomes. Nurses implement interventions and actions to transition clients from problem or present states to more desired outcomes states. Pesut (2006) notes four C's (contrast, criteria, concurrent considerations, and conclusions) as

essential thinking strategies that support clinical judgment. The four C's in clinical judgment in the model involve reflection about the *contrast* between present and desired state; *criteria* regarding achievement of the desired state; *concurrent considerations* of the problem, outcome, and intervention; and *conclusions* or judgments about outcome achievement (Pesut, 2004, 2006; Pesut & Herman, 1999).

Because NNN languages exist and are being incorporated into nursing information systems, it is important that educators consider how to promote the use of standardized languages and help students think, learn, and reason with these standardized nursing languages as they learn to provide care in patient settings. The authors considered standardized language represented in the NNN classification systems as a clinical vocabulary for clinical reasoning. This research examined the degree to which students used NNN language as they developed clinical reasoning skills using the OPT model as a guide for thinking and reasoning about nursing care needs of clients during the students clinical practicum.

### **Research Aims**

The research aims of this retrospective analysis were to evaluate the use of the OPT model as a structure or scaffold for application and learning about relationships between and among standardized nursing language terms as they support clinical reasoning and client care planning. In addition, a second goal was to determine the extent of students' use of the NNN language to represent nursing diagnoses, interventions, and outcomes associated with clinical reasoning about client care stories and situations.

### **Methods**

#### **Setting**

The research was conducted in a midsize city in the southeastern United States at a school of nursing in a historically black college and university. This long-standing nursing program admits a heterogeneous population of students; however, the majority of students and faculty are African American. Clinical settings for students completing their medical surgical nursing practicums include a Level 1 trauma center (1000 beds) and a nonprofit, tertiary care hospital (850 beds). During the study, students had clinical experiences on acute care units with cardiac monitored beds for 10 weeks in one of these two institutions. At the time of initial data collection, two of the researchers were faculty members at the university, at the same time clinical instructors for the junior level, medical surgical nursing course in which this sample of students were enrolled.

#### **Sample**

For this study, OPT worksheets from 10 students were purposively chosen from a cohort of 23 junior baccalaureate nursing students completing their clinical practicum for their junior year medical–surgical course. This sample of 10 students all spoke English as their primary language. The mean age of the sample was 28 years. One was a male student, six were African American, and four were Caucasian. Six students were single, and five had children. Three had a previous degree and eight were certified nursing assistants. The mean number of hours per week of employment was 15 and the mean course load was 12 semester hours. This sample could be considered nontraditional, yet typical of nursing programs throughout the country. The 10 students were chosen to reflect the same demographics as the whole student group and to include some students who had done well when completing the OPT model worksheets and some who had done poorly, as well as some students who had been evaluated by clinical faculty members as being strong and some who had been evaluated as having been weak in clinical preparation and performance.

#### **Procedures**

Data for this study was derived from a sample of students who participated in an educational research project (Kautz, Kuiper, Pesut, Knight-Brown, & Daneker, 2005). The overall aim of that project was to evaluate the effects of the OPT clinical reasoning model on the thinking processes of undergraduate nursing students on acute care units with clients who had multiple health problems. As a part of the clinical assignment in the 10-week clinical practicum, the students completed clinical reasoning webs. A sample web is included as Figure 1. A clinical reasoning web is a visual representation of all the potential and actual nursing diagnoses related to a client's story. Once diagnoses are identified, students are asked to draw lines of association linking the

diagnoses and explain the patterns of relationships between and among the diagnoses. For example, if *pain* and *anxiety* were linked together, the student is expected to state how specifically pain and anxiety are related. The teaching-learning intervention behind the use of clinical reasoning webs is to help students make connections about the interactive, dynamic, cause–effect, and associational interactions among multiple nursing diagnoses and clients’ core needs. The OPT model worksheets reflect the model structure and provide a way for students to organize and record this work. A sample OPT model worksheet corresponding to the sample web is included as Figure 2. In order to promote reflection while creating and explaining clinical reasoning webs and OPT model worksheets, students kept written journals during the practicum experience. For more information on journaling using OPT model and Self-Regulated Learning–structured prompts with this sample of students, see Kautz et al. The webs and OPT model worksheets were rated each week and the students received feedback regarding their progress from the clinical faculty.

For this study, retrospective descriptive evaluation of OPT model worksheets was done to analyze the extent to which students used NNN language. The purpose of the analysis was to determine how often NNN language was used for outcomes and interventions because the students used clinical resources such as medical-surgical textbooks and a variety of nursing diagnoses and care plan texts as the source of nursing language. The medical-surgical texts and nursing diagnoses texts all incorporated some NNN language.

The first step in the protocol involved the student completing a clinical reasoning web to assist in identifying the keystone issue or priority NANDA diagnosis that would become the focus of the OPT model worksheet. In the sample web included as Figure 1, the student identified the NANDA diagnosis of *decreased cardiac output* as the keystone issue for a client with sepsis. *Decreased cardiac output* would determine the input in the “present state” space of the OPT model worksheet. *Decreased cardiac output* would then be contrasted with the desired outcome of Effective Cardiac Output. The student then completed the OPT model worksheet (Figure 2) to develop the outcomes, tests, and interventions related to the priority NANDA diagnosis.

As a way to measure use of standardized nursing language, the authors developed the NNN scoring instrument for data collection, which is included as Figure 3. Using the NNN scoring instrument, the students’ use of NNN language was evaluated each week. Since the OPT model emphasizes outcomes instead of problems, the first step was to document the students’ use of NOC language. The Outcome State portion of the OPT model worksheet was evaluated and the rater determined if the student had included either a “stated” or “implied” NOC for the appropriate nursing diagnosis that had been selected as the priority keystone problem for that client. The raters then evaluated the students’ choices of outcomes and tests to see how many matched official NOC indicators. The NOC indicators serve as criteria for outcome achievement as illustrated in Figure 4. The second step repeated the process to evaluate the use of NIC language. The raters chose a NIC category and the accompanying NIC activities for the keystone issue that were the best matches for the student's choice of interventions (Figure 5). Using the NNN scoring grid, 100 OPT worksheets were evaluated by three independent raters for frequency and use of NNN language on the OPT model worksheets. In the majority of cases, student outcomes and interventions were not consistently labeled in NNN language. Thus, raters were challenged to make a best match of the student's words to the appropriate NICs and NOCs. A check of interrater reliability between the three raters for coding a random sample of 20 worksheets for NNN language was 65% for NOCs and 45% for NICs. A possible explanation for the low percentages of interrater reliability could be linked to the differing clinical backgrounds of the raters (e.g., critical care, neurologic rehabilitation, and medical telemetry/intermediate critical care) and their interpretation of nursing care needs given this past knowledge and experience.

**FIGURE 3 IS OMITTED FROM THIS FORMATTED DOCUMENT**

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## **FIGURE 5 IS OMITTED FROM THIS FORMATTED DOCUMENT**

### *Results*

Students stated the priority keystone problem in the appropriate NANDA format 92% of the time. An outcome stated in NOC language was juxtaposed with a NANDA diagnosis 22% of the time and implied with other language 72% of the time. Students were more proficient at identifying problems or NANDA diagnoses and less proficient at specifying outcomes. Interventions stated in NIC language corresponded to the NANDA diagnosis 61% of the time. Students included interventions that were appropriate for the client's priority keystone problem but did not correspond to NIC language 39% of the time. Students consistently linked nursing interventions activities with NANDA diagnoses rather than NOC outcomes.

### *Discussion*

This research reveals that NNN language was not used consistently by students in completing the OPT model worksheets in the clinical area. Because this is a retrospective analysis, the authors speculated regarding a few possible explanations for these findings. Either the resources used by the students were not consistent in the use of NNN language or the students did not choose NNN language from the resources when completing their OPT model worksheets. If consistent use of NNN is an educational goal, our findings suggest that clinical instructors need to promote the use of NNN and give consistent feedback each time the student turns in clinical assignments to encourage students to use NNN language when completing their clinical assignments. The need for consistent feedback each week is based on our research with these students in helping them learn the OPT model (Kautz et al., 2005). We recommend faculty members use the OPT tools to give students feedback on their work. A systematic approach to teaching the relationships between and among diagnoses, NIC interventions, and NOC outcomes is not possible unless faculty make these relationships explicit. Despite the inconsistent use of NNN language, the OPT model worksheets promoted identification of priority nursing diagnoses that were often associated with implied outcomes and a list of appropriate interventions. Evaluation of OPT model worksheets provided the faculty with guidance about student understanding of patterns and relationships between and among the priority problems, outcome achievement, and appropriate understanding and use of interventions to achieve desired outcomes.

The raters discovered student resources were not as consistent or comprehensive in NNN language as the NIC (Dochterman & Bulechek, 2004) and NOC (Moorhead, Maas, & Johnson, 2003) and NNN linkage (Johnson et al., 2006) texts. If consistent use of NNN is expected, students and faculty need NANDA, NIC, NOC, and NNN linkage resources to make the content available. All three raters noted that the students who consistently used NNN language with OPT models were the students who performed well in the clinical area and did better in completing their clinical reasoning webs and OPT model worksheets. It may be that learning standardized nursing language and using the OPT model to frame clinical reasoning activities provides the knowledge driven content for success in professional nursing.

Matching the student's written words to appropriate NICs and NOCs was a challenge. It quickly became apparent that each rater viewed each student's narrative differently. This is a key finding of this study because both faculty members and students believe what they are reading and writing will be interpreted similarly by other students, teachers, and practicing nurses. However, when compared against the precise NIC and NOC standardized language the researchers saw that different practice backgrounds led to different interpretations of what students recorded. Even though the study sample was small, we suspect that these differences in clinical interpretation and meanings between and among faculty members are significant issues in practice and clinical education.

### *Implications*

The results of this study imply that standardized nursing language was not consistently used by the faculty or students in this sample. The inconsistent use of NNN language by practicing nurses, students, and clinical instructors creates confusion and impedes the development and adaptation of standardized language among professional nurses. All healthcare institutions will be required to implement electronic client records by 2010

and many will choose NNN as the language of these records (Lunney, 2006). If educators fail to incorporate the use of standardized nursing language in nursing curriculum, and hospitals adapt nursing information systems that utilize standardized language, then how will students be prepared to practice? Such a disconnect in values and beliefs among the academic and clinical practice settings about the value of standardized language that influences clinical thinking and reasoning needs attention. In conducting this analysis of 100 student worksheets, the authors conclude that it is necessary to use NNN language to see its value for professional nursing practice.

One of the authors is practicing full time on a medical telemetry/intermediate care unit and noted when rating the OPT models with NNN language resources that another value of NNN language would be to facilitate direct billing for nursing services and show the value of nursing care. This practice application of NNN language has been long advocated by NIC and NOC and NANDA authors. Nursing information systems that capture patient data with NNN language will also support future knowledge work in nursing. While nursing information systems utilizing NNN language have been incorporated in practice settings, clinical instructors need to learn to utilize these systems when teaching nursing students at all levels.

Further research is needed to examine the facets of clinical reasoning, including content (NNN language), structure (OPT model), process (self-regulated reflection on content and structure), and outcomes (student OPT model, NNN taxonomies, and self-regulated reflection). The OPT model and NNN language are effective tools for documenting students' progress in learning clinical reasoning on a weekly basis in their clinical practicum. Faculty members who teach using these tools may find that students are more able to differentiate between patient needs, prioritize care, and make more complex patient care decisions. We recommend faculty members and students use the NANDA (NANDA International, 2005), NIC (Dochterman & Bulechek, 2004), NOC (Moorhead, Maas, & Johnson, 2003), and NNN Linkages (Johnson et al., 2006) reference texts throughout the undergraduate and graduate programs. Faculty can utilize these texts in test construction, cite NNN language and linkages in course syllabi and lectures, and require students to utilize NNN language in care planning and class presentations. Lunney (2006) gives additional suggestions for educators and managers for incorporating NNN language into practice and education.

In summary, the organization of clinical reasoning into structure, content, and process appears to yield the outcomes desired in nursing education and practice. The attention to all these pieces simultaneously is a daunting task and heretofore has been implemented by educators and studied by researchers in isolation of each other. We believe that only by bringing structure, content, and process together in future work will the understanding and promotion of clinical reasoning move forward. Organizing the essence of health care and vast areas of information the nurse has to learn and cope with on a daily basis will advance the profession of nursing into the twenty-first century.

### *Acknowledgment*

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