

Helping Nurses Use NANDA, NOC, and NIC Novice to Expert

Margaret Lunney, PhD, RN

The electronic health record (EHR) requires the use of standardized nursing languages such as NANDA, NOC, and NIC. Helping nurses use these languages for an EHR requires different educational strategies in 3 domains: intellectual, interpersonal, and technical. The author explains the rationale for changes in educational methods, expectations that educators and managers should set for students and nurses at various levels of expertise, and teaching strategies in each of the domains.

In the United States, implementation of an electronic health record (EHR) is imminent; by 2010, all healthcare events will be electronically recorded and healthcare agencies will be required to submit data elements to regional and national data banks.^{1,2} With an EHR, nursing data elements will be documented through the use of standardized nursing languages such as those published by NANDA International and the project teams of the Nursing Outcomes Classification (NOC) and the Nursing Interventions Classification (NIC).³⁻⁵ These and other standardized languages that were approved by the American Nurses Association for use in electronic records provide a broad base of nursing knowledge at the point of care and enable the documentation of nursing care elements in formats that support the aggregation of data.⁶ Aggregation of nursing data enables the development of knowledge related to the quality and cost of care in agency units and comparison of quality and cost across localities and time periods.

Rationale for Educational Changes

Three major reasons for changes in educational methods are: (a) use of standardized nursing languages in the nursing process differs from the traditional nursing process; (b) use

Author Affiliation: Professor and Graduate Programs Coordinator, Department of Nursing, College of Staten Island, The City University of New York, Staten Island, NY.

Correspondence: Department of Nursing, College of Staten Island, 2800 Victory Boulevard, Staten Island, NY 10314 (lunney@mail.csi.cuny.edu).

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of standardized nursing languages requires increased attention to development of intellectual, interpersonal, and technical competencies; and (c) accurate diagnosing is the basis for appropriate selection of patient outcomes and nursing interventions. These reasons are explained as the basis for helping nurses to implement NANDA, NOC, and NIC (herein referred to as NNN) and other nursing languages. The systems of NNN are addressed in this article but a majority of these teaching methods also apply to other languages.

Differences in the Nursing Process With Use of NNN

When nurses have opportunities to use standardized languages such as NNN, significant differences exist from use of the traditional nursing process. Without use of NNN, nurses are probably not aware of the extensive number of data interpretations, outcomes, and interventions to consider for individual patient situations. With use of NNN in an EHR, knowledge of 172 diagnoses, 330 patient outcomes, and 514 nursing interventions can be easily available.³⁻⁵

Decision support systems can also be included in an EHR that prompt nurses to consider the link-

ages of cues with diagnoses, and diagnoses with outcomes and interventions. Without the use of NNN in an EHR, nurses are often encouraged to collect large amounts of data without naming data interpretations. With the use of NNN in an EHR, decisions about data collection are based on initial cues to diagnoses and diagnostic hypotheses being considered for individual patients.

Without the use of NNN in an EHR, nurses describe patient outcomes and interventions in a narrative format with little consistency among nurses. With the use of NNN in an EHR, the names used for patient outcomes and nursing interventions are easily available to all nurses so consistency and continuity will be expected.

Without the use of NNN in an EHR, nurses may not be held accountable for the accuracy of their data interpretations. With the use of NNN in an EHR, nurses' diagnoses are easily noted and addressed, so accountability for accuracy will be critically important to save the time and money involved when many nurses provide care for inaccurate diagnoses. For example, if one nurse selects the diagnosis of *Deficient Knowledge* when a patient has adequate knowledge and then many nurses waste time in teaching, there will be excessive costs without positive outcomes.

Development of Competencies

Intellectual, interpersonal, and technical competencies support the accountability that is needed for collection and interpretation of patient data, as well as appropriate selection of patient outcomes and nursing interventions. Based on the improved organization of an EHR over paper records, the choices of individual nurses' diagnoses, outcomes, and interventions will be addressed by all nurses involved in care of the same patients. Thus, nurses' choices will have broader, more profound effects on nursing care in general, not just the care provided by themselves. In theory, continuity of care was supposed to occur with use of paper records, but, with the inability to effectively track data, continuity of care was not realized.²

Accurate Interpretations of Data are Foundational

In a classic study, it was established that short-term memory only holds 7 ± 2 bits of data,⁷ so nurses, as all human beings, continuously convert bits of data or cues to interpretations. For example, the interpretation that a person is a male or female is based on the cues of hairstyle, facial structure, body type, body language, clothes, name, and others. It is common to think of such interpretations as "fact" because these interpretations are relatively valid and reliable. Other interpretations, however, such as the patient is happy, sad, or anxious, are not likely to be valid and reliable unless nurses attend to the accuracy of interpretations.

In clinical situations, data bits are continuously converted to interpretations to save space in short-term memory. The advantage of naming these interpretations, instead of intervening without naming them, as when nurses' diagnoses are not stated, is that accuracy can be discussed with others and challenged when indicated. Nurses' interpretations of patient data determine all subsequent actions, including additional data to collect, possible outcomes to consider, and choices of interventions.

Additionally, studies since 1966 have shown that there is a high

potential for inaccuracy in nurses' identification of diagnoses and contributing factors.⁸ In every study of nurses' interpretations of the same data elements, there were wide variations in interpretations of data, even with strong data support for the most accurate diagnoses. These variations in interpretations are influenced by 3 major factors: the diagnostic task (eg, complexity and amounts of data), the situational context (eg, organizational policies, nurses' roles), and nurses' abilities as diagnosticians (eg, thinking abilities, experience with similar cases).⁸⁻¹⁰ Studies have shown that high accuracy is associated with nurses being educated as diagnosticians.⁸

Set Expectations: Novice to Expert

In setting expectations for students and nurses, it is important that educators and managers do not underestimate nurses' abilities to effectively use standardized nursing languages and incorporate them with other knowledge bases. Based on the author's experience teaching NNN to nurses at all levels of expertise, novices and advanced beginners learn to use NNN as well, if not better and easier than, experienced nurses. This is because they have not had enough experience in nursing to know other ways of doing things. The languages of NNN can be used throughout basic nursing programs, from the first week, as part of a framework for practice along with theories and models of nursing.¹¹ In contrast, nurses at competent, proficient, and expert stages need to be "sold" on new ways to think and document nursing care (Figure 1).

Expectations should be set for nurses at all levels of expertise to correctly use NNN. If students and nurses are shown how to apply the languages using written or computerized case studies, they can successfully implement the languages with new cases. Some common errors that might occur are restating medical diagnoses as nursing diagnoses without providing added information about the patient; for example, if a patient had an amputation 2 years ago, the diagnosis of *Impaired Phys-*

ical Mobility is only appropriate if nurses currently plan to help this patient to improve mobility. The purpose of nurses' diagnoses should be to guide nursing interventions, not to label patients with nursing diagnoses.

New users often do not realize that the neutral outcome labels (eg, *Weight Control*) and the associated overall score on specific scales (eg, 3 = sometimes demonstrated), are the outcome, not the indicators, and the intervention labels (eg, *Presence*) are the interventions, not the activities.^{4,5} For the outcomes in NOC, the indicators serve as evidence to help patients and providers to identify overall scores prior to and after nursing interventions. For the NIC interventions, the activities represent how to do the intervention and are individually applied according to patients' needs.

Students and nurses should be expected to correctly use the concepts in each system in accordance with the concept definitions, descriptions, and the context of each clinical situation. For example, the NANDA International diagnosis of *Social Isolation* is not used unless the patient is being rejected by others, not if he or she chooses to be alone.³ The NOC outcome of *Knowledge: Diet* should not be used if the person already has extensive information about the recommended diet. There are many reasons why people do not follow recommended diets besides *Deficient Knowledge*.

The NIC intervention of *Coping Enhancement* should not be used if the patient problem to be treated is *Stress Overload* rather than *Ineffective Coping*. With stress overload, a better intervention might be *Environmental Management*. The diagnosis of Stress Overload is not currently on the NANDA International approved list of diagnoses, but this taxonomy is not complete, so nurses should be developing their own diagnostic labels when indicated.

Regardless of whether patient and family cues are a "good fit" with the definition and description of a concept in one of these systems, the context of a clinical situation may indicate that the concepts are not relevant. For example, if patients prefer assistance with a different aspect of

1. For scientific disciplines, language classifications are essential to establish the common meanings of terms.(20)
2. File names are needed for electronic systems; the concepts of NNN are the file names.(3–5)
3. With use of NNN in an EHR, nurses have knowledge immediately available, and do not have to rely on memory.(4,5)
4. The availability of file names and standard codes enable the aggregation and comparison of nursing data, which contributes to the advancement of nursing knowledge.(4,5)
5. Ability to measure patient care outcomes related to diagnoses and interventions contributes to improvements in quality and cost.(1,2)
6. Inclusion of human response data in healthcare records provides more information about the health status of consumers.(8)
7. Standardized nursing languages are compatible with theories of nursing, (eg, Neuman).(11)
8. Selected diagnostic, outcome and intervention concepts can be used to describe specialty practice (eg, psychiatric nursing critical care, school health).(4,5)
9. NNN describes what nurses bring to the interdisciplinary table, so the advantages of nursing care can be visible to all.(3, 4, 5, 8)
10. With articulation and measurement of nursing care, it is more likely that someday nurses will get paid for their diagnoses and interventions, instead of being included under "bed and board."

Figure 1. Ten selling points for the use of NANDA, NOC, and NIC (NNN) in EHR.

their health than nurses' diagnoses, nurses should consider following patients' preferences.

At all levels of expertise, learners should be encouraged to perform ongoing self-evaluation or reflection to generate continued professional growth in use of these languages. This process involves purposeful evaluation of one's own thoughts or behaviors to facilitate learning from experiences. Benner¹² and Smith and Jack¹³ described reflective practice as a key aspect of growth in professional expertise. In a Delphi study of 55 nurse experts in critical thinking, reflection was identified as a habit of mind for critical thinkers in nursing.¹⁴ With ongoing reflective practice, nurses' choices of terms from NNN are likely to improve so that they more accurately reflect the complexity of patient care.

Nurses who are at competent, proficient, or expert stages of expertise should be assisted to integrate NNN with previous knowledge bases and to use NNN for communication of various aspects of advanced practice nursing. When nurses are assisted to integrate NNN with previous knowledge, it demonstrates the usefulness of these systems to existing practice. For example, community health nurses can be shown how to use the health promotion diagnoses, outcomes, and interventions from NNN. For nurses in graduate programs, the

use of NNN is ideal to communicate advanced practice nursing competencies such as developing standards of care. Standards of care can be developed for specific patient populations by identifying the relevant diagnoses, outcomes, and interventions and the linkages of diagnoses, outcomes, and interventions that are important to meet quality-based standards.

Strategies

To enable the use of NNN, intellectual, interpersonal, and technical abilities must be developed. There are specific strategies that can be employed to develop abilities in each category.

Intellectual Domain

The most significant change in teaching strategies needs to occur in the intellectual domain, with educators and managers promoting nurses' development as diagnosticians.¹⁵ The intellectual competencies needed are (a) attainment of knowledge related to diagnoses, outcomes, and interventions and (b) development of related thinking abilities. With over 1,000 concepts, definitions, and descriptors in NNN, the knowledge required is extensive and complex. With electronic systems, however, the concepts for diagnoses, outcomes, and interventions can be frontloaded in the

software, whereas definitions, descriptions, and bibliographies can be in the background for use as needed.

To effectively use these systems, the thinking processes of nurses must be enhanced. Like other adults, the thinking process abilities of nurses vary widely. For example, the wide range of nurses' thinking abilities was evident in the findings from a study of basic divergent thinking abilities of 86 nurses with generic baccalaureate education and 1 to 5 years experience.¹⁶ The 2 rater averages of scores ranged from 6 to 41.5 for fluency, from 0 to 27.5 for flexibility, and from 7 to 30.5 for elaboration. Thinking abilities such as these can be improved with education and effort.¹⁷

The increased emphasis on critical thinking in nursing that has occurred in response to accreditation criteria may contribute to improved thinking abilities. Findings from a Delphi study of 55 nurse experts in critical thinking yielded a model of critical thinkers that can easily be used by educators and managers to help students and nurses grow in thinking abilities.¹⁴ Seven cognitive skills and 10 habits of mind were identified as relevant for nursing practice. Use of these 17 critical thinking concepts can facilitate both beginning students and experienced nurses to think about their thinking (ie, metacognition) and, subsequently, improve their thinking processes.¹⁸

Laura (fictitious name) is a 30-year-old woman in “good health” who smoked 1 – 2 packs of cigarettes per day for more than 12 years. She asked the nurse for assistance to quit and stated “I know it is not good for me and I want to stay healthy.”

Diagnosis of human response

Health seeking behavior: smoking cessation

Definition: Active seeking (by a person in stable health) of ways to alter personal health habits and/or the environment in order to move toward a higher level of health.

Outcome status prior to nursing interventions

NOC outcome: *risk control: tobacco use.*

Definition: Actions to eliminate or reduce tobacco use

The nurse and Laura rate outcome as 3 (sometimes demonstrated). The target score is 5 (consistently demonstrated).

Laura's outcome indicators and scores on the 5-point scale

- Monitors environment for encouraging tobacco use (2)
- Monitors personal behavior for tobacco use (2)
- Develops strategies to eliminate tobacco use (3)
- Commits to tobacco use control strategies (3)
- Uses support group to eliminate tobacco use (1)
- Eliminates tobacco use (1)

Nursing interventions

■ *Smoking cessation assistance*

Definition: Helping another to stop smoking

Activities for smoking cessation assistance:

- Give Laura clear, consistent advice to quit
- Assist Laura in choosing strategies
- Motivate her to set a quit date
- Refer to group programs or individual therapy
- Inform Laura of possible symptoms
- Help plan coping strategies and resolve problems

Outcome status after nursing interventions

Risk control: tobacco use

■ After 6 weeks, the nurse and Laura rated outcome as 5

Laura's outcome indicators and scores on the 5 point scale

- Laura consistently monitors her environment and personal behaviors for factors that affect her tobacco use (5)
- Laura developed effective strategies and remains consistently committed to controlling her use (5)
- Laura uses friends and group for help (5)
- Laura has not smoked for 6 weeks (5)

Figure 2. Case Study: Laura.

To help students and nurses improve their thinking processes, educators and managers should assume that thinking is human, imperfect, and attainable.¹⁹ This means that students

and nurses are capable of appropriate thinking processes; they should expect to make mistakes in thinking; and thinking abilities can be improved. To promote thinking, educators should

ask questions instead of providing answers, provide opportunities for problem solving, and deflate authority. Deflation of authority enables students to stop expecting the “right”

Stella (fictitious name) is a 49-year-old, single, Italian American woman with type 2 Diabetes who is overweight, but her diabetes is in adequate control. Stella is the head of the household with an 80-year-old dependent mother. She works full time and provides complete care of herself and her mother, including housework, shopping, and taking her mother for physician visits. Stella accepts the care of her mother but has many frustrations. Previous attempts to reduce her workload have failed; her mother thinks she can “do it all” and resists Stella’s attempts to involve her brother in helping the mother. Stella expresses conflicting emotions, high levels of stress, and lack of control. Only 1 nursing diagnosis is included here even though there were other responses that were addressed with Stella.

Diagnosis of human response

Risk for caregiver role strain

Definition: Caregiver is vulnerable for felt difficulty in performing the family caregiver role

Outcome status before nursing interventions

Caregiver well-being

Definition: Caregiver satisfaction with health and lifestyle circumstances

The nurse and Stella rate the outcome as 3 (moderately satisfied). The target score is 4 or 5 (very or completely satisfied).

Stella’s outcome indicators and scores on the 5-point scale

- Satisfaction with physical health (3)
- Satisfaction with emotional health (2)
- Satisfaction with usual lifestyle (3)
- Satisfaction with instrumental support (2)
- Satisfaction with social relationships (3)

Nursing interventions

Assertiveness training

Definition: Assistance with the effective expression of feelings, needs, and ideas while respecting the rights of others

Other NIC interventions:

Emotional Support

Caregiver Support

Role Enhancement

Family Involvement Promotion

Activities for Assertiveness Training:

- Determine barriers to assertiveness (eg, family roles)
- Help Stella recognize and reduce cognitive distortions
- Instruct Stella in different ways to act assertively
- Facilitate practice opportunities using discussion, modeling and role playing
- Help Stella practice conversational skills

Outcome status after nursing interventions

Caregiver well-being

After 4 weeks, nurse and Stella rated outcome as 4 (very satisfied).

Stella’s outcome indicators and scores on the 5-point scale

- Stella’s physical health has improved; satisfaction with physical health (4)
- Stella uses assertiveness skills to make time for herself after work and to plan recreation; satisfaction with emotional health (4)
- Stella continues to need help in the performance of caregiver role (4)
- Stella feels in control of her caregiver routines and expresses satisfaction with caregiver role (4)

Figure 3. Case Study: Stella.

answers from teachers and other experts and, instead, to depend on their own abilities to process information and make decisions. Educators can show students how to think through problems by thinking aloud with students and acting as midwives or coaches to help learners apply a range of thinking processes.¹⁹

Seminar methods of teaching should be used throughout basic and advanced nursing education to promote the use of thinking processes. This method is achieved by assigning readings for each class, organizing classes according to the readings, providing students with discussion questions so they can be prepared, recording the number of times that students participate, giving a grade each week in accordance with specific grading criteria, and rewarding students with 25% to 30% of their overall grade. The goal of each class is to address what the author is saying, the fit with previous knowledge, and the practice application. The teacher grades students on their participation and on evidence that they have done the readings, not on giving “correct” answers. As seasoned teachers are aware, students participate when teachers avoid lecturing, sit at eye level with students, and show respect for students’ answers. The seminar method promotes improved thinking because it stimulates thinking processes, recognizes students’ and nurses’ abilities to think without authorities, and demonstrates that collaboration with the thinking of others is productive.²⁰

Sharing paradigm cases (Figures 2 and 3) helps learners visualize and experience use of the 3 languages. The patient’s story is told so that students and nurses have the context of the situation²¹ and not just the cues to diagnoses. Educators can also simplify cases as needed for learners to be able to see the connections among data, diagnoses, outcomes, and interventions. An interactive case study method called iterative hypothesis testing provides learners with experience in asking questions to obtain diagnostic data.^{15,22} With this method, the goal is for learners to identify the most accurate diagnosis. Using role-playing techniques, the teacher pretends to be a specific clinical case with a human response that requires diagnosis and

intervention and provides learners with a few beginning cues, such as gender, age, and reason for contact. After that, the teacher only provides data if students request it, along with the reasons why the question was asked. For example, a student might ask, “how did you feel about that?”. The student could accompany this question with a rationale of, “I am considering issues related to coping, anxiety or fear.” This process continues until the class as a whole attains an accurate diagnosis or time runs out. This is a time-consuming but effective method to teach diagnostic reasoning.

Interpersonal Domain

Increased attention to interpersonal competencies is needed so that nurses will be able to obtain valid and reliable data and work in partnership with patients and families to select the best diagnoses, outcomes, and interventions. With the complexity of choosing the most appropriate concepts to fit the diverse clinical situations that nurses address, the best use of NNN requires that nurses work in partnership with patients and families. Developing partnership relationships enables nurses to avoid inappropriate and unethical labeling, for example, using the diagnosis of *Impaired Parenting*³ for a Mexican American couple when the father does not participate in infant care. Mexican American women use a Doula, a woman with childcare experience, instead of expecting help from the father.²³

Developing partnership relationships requires exquisite communication. Curricula in schools of nursing and healthcare agencies should be examined for whether additional course work on communication, especially *Assertiveness Training* and *Complex Relationship Building*,⁵ is warranted. Assertiveness training helps learners express their ideas while respecting the ideas of others.

Interviewing skills can be demonstrated by educators through role playing and video tapes. Students and nurses can be videotaped during history taking for them to evaluate their own development. They also need to be taught the language of validating interpretations with patients and families; for example, with Stella

(Figure 3), the nurse could say, “it seems to me that, as a caregiver, you are tired and may be at risk of high amounts of stress in the caregiver role. Is that correct?”

Technical Domain

Teaching strategies for students’ development in the technical domain are similar to current methods with greater emphasis on collecting valid and reliable data, developing diagnostic reasoning abilities, teaching how to perform a broad range of NIC interventions, and learning how to document nursing care using NNN. Knowing how to collect specific data to rule in or rule out diagnoses (eg, *Pain* or *Disturbance in Body Image*)³ will enable nurses to achieve higher accuracy by obtaining the essential data to support or reject diagnostic hypotheses. Applying evidence-based practice protocols facilitates selection of the best diagnoses for individual patients especially because identifying patient preferences is one aspect of such protocols.²⁴ With the ease of selecting intervention labels in electronic systems, nurses can select interventions without sufficient knowledge of how to perform the interventions. Knowing how to perform complex nursing interventions (eg, *Reminiscence Therapy*, *Biofeedback*, *Acid-Base Management*)⁴ will facilitate appropriate use of the intervention labels to help patients.

Use of professional practice standards that articulate evidence-based knowledge may indicate that additional education is needed for specific interventions. With respect to documentation of NNN, for example, learners need to know how to use the indicators to rate outcomes both before and after interventions. In assignments, incentives can be provided for the correct use of NNN (eg, a percent of students’ grades are allocated to following directions regarding the use of these systems).

Conclusions

Although NNN and other nursing languages represent the knowledge that

educators have been teaching for decades, the evolution of standardized nursing languages and their importance in an EHR requires a bold emphasis on teaching methods. The routines with electronic systems will include systematic follow-up of nurses' diagnoses, outcomes, and interventions and examination of the effects of these choices on quality and cost. These routines will prompt more stringent accountability for naming the elements of nursing care.² Educators and managers who encourage and support students and nurses at novice to expert stages to develop the intellectual, interpersonal, and technical abilities for use of NNN will be rewarded by seeing the learners grow in these abilities.

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