Informatics in the Doctor of Nursing Practice Curriculum

[1]Melinda Jenkins, PhD, FNP, [2]Marisa Wilson, DNSc, MHSc., RN,
[3]Judy Ozbolt, PhD, RN, FAAN, FACMI, FAIMBE
[1]Seton Hall University College of Nursing, South Orange, NJ, [2,3]University of
Maryland School of Nursing, Baltimore, MD

Abstract

In 2006, The American Association of Colleges of Nursing approved a new doctoral degree for clinical leaders, the Doctor of Nursing Practice. These new advanced practice leaders will need sophisticated skills in informatics to acquire and use data, information, and knowledge in their roles. This paper proposes a foundational course for all Doctor of Nursing Practice students and some strategies for integrating informatics throughout the curriculum.

Introduction

As the Institute of Medicine noted in 1991 and reiterated in 1996, informatics is an essential technology for health care. Informatics has not, however, been well integrated into the curricula of most schools of nursing or medicine. Like other clinical disciplines, nursing faces questions of what informatics content to include in educating practitioners, and how to integrate informatics with science, clinical practice, and health systems management.

In 2006, the American Association of Colleges of Nursing (AACN) championed the adoption of a new kind of doctoral degree, the Doctor of Nursing Practice, or DNP[1]. This new degree focuses not on research, as the PhD, DNSc, and similar degrees do, but on innovative, practice-focused leadership for advanced nursing practice. Graduates of DNP programs are to lead improvements in healthcare outcomes through roles in care management, education, administration, and policy development and implementation.

In its Position Statement on the Practice Doctorate in Nursing[2], the AACN cited a survey by Marion and colleagues[3] that contrasted practice-based doctorates with research-based doctorates. Compared to research-based doctoral programs in nursing, practice-based curricula offered:

- less emphasis on theory and meta-theory;

- considerably less research methodology content, with the focus being on evaluation and use of research rather than conduct of research;

- different dissertation requirements, ranging from no dissertation to theses or capstone projects (termed dissertations in some programs) that must be grounded in clinical practice and designed to solve practice problems or to inform practice directly;

- an emphasis on practice in any research requirement;

- clinical practica or residency requirements; and

- emphasis on scholarly practice, practice improvement, innovation and testing of interventions and care delivery models, evaluation of health care outcomes, and expertise to inform health policy and leadership in establishing clinical excellence.

For new DNP programs, the AACN has identified eight essential areas of curricular content. They are:

- Scientific Underpinnings for Practice

- Organizational and Systems Leadership for Quality Improvement and Systems Thinking

- Clinical Scholarship and Analytical Methods for Evidence-Based Practice

- Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care

- Health Care Policy for Advocacy in Health Care

- Interprofessional Collaboration for Improving Patient and Population Health Outcomes

- Clinical Prevention and Population Health for Improving the Nation's Health

- Advanced Nursing Practice[1]

Developing curricula for the DNP affords an opportunity to explore and define ways to integrate the rapid national advances in health information management into preparation for advanced nursing practice and leadership. These deliberations may prove instructive to faculty members in other clinical disciplines who confront similar challenges.

This paper proposes informatics content that the authors believe to be foundational for all DNPs. Following the American Association of Colleges of Nursing Essentials document, we present suggestions for an informatics specialty course and for integration of informatics content into DNP courses throughout the curriculum.

Moreover, this paper introduces the concept of informatics within the DNP curriculum versus DNP with an informatics focus. The latter path may lead to significant transformational change in the health care setting as well as the development of a stronger cadre of Chief Nursing Informatics Officers (CNIOs) within health care settings.

Informatics as an Essential Technology for Scholarly Practice

Informatics is the "scientific field that deals with biomedical information, data and knowledge—their storage, retrieval, and optimal use for problem-solving and decision making". [4] DNPs will use informatics to support scholarly modes of practice, characterized by:

- Care processes based on evidence or on logical inferences from the scientific literature;

- Investigations to improve practice and outcomes;

- Development and testing of new practice models and interventions;

- Contributions to health care policy. [1,,3,4,5]

To achieve scholarly practice, DNPs will rely on informatics to

- Search knowledge bases and retrieve relevant scientific evidence, guidelines, protocols, and the like;

- Capture, acquire, retrieve, aggregate, and analyze clinical, educational, and management data to evaluate and improve care processes, educational endeavors, and patient outcomes;

- Assess current practices and design new models;

- Synthesize evidence and knowledge, track trends, predict futures, and recommend policies;

- Serve up knowledge bases and decision support.

As clinical leaders, DNPs need to know what data must be included in data repositories to build evidence for improving practice. They may be guided by the American Nurses Association (ANA), whose National Database of Nursing Quality Indicators includes, for acute care: [6]

- Patient falls

- Pressure ulcers

- Physical/sexual assault

- Pain management

- Peripheral IV infiltration

- Staff mix
  - Registered Nurses (RNs)
  - Licensed Practical/Vocational Nurses (LPN/LVNs)
  - Unlicensed assistive personnel (UAP)

- Nursing care hours provided per patient day

- RN education/certification

- RN Survey

In addition, the ANA and other groups have begun to identify indicators for non-acute care. ANA non-acute care nursing-sensitive indicators include: [7]

Pain management

Cardiovascular prevention

Consistency of communication

Care giver activity

Staff mix

Identification of primary care giver

Client satisfaction

Psychosocial interaction

Prevention of tobacco use

Activities of Daily Living (ADL)/ Instrumental Activities of Daily Living (IADL)

Besides these recommendations, meta-analyses of process and outcomes of advanced practice nurses show a need to collect data on nursing interventions such as patient education and care coordination. [8, 9, 10] The Institute for Nursing Centers (http://www.nursingcenters.org/) has carefully developed a list of indicators to assess financial and clinical data within and across nurse-managed centers. [11] Data include patient and staff demographics; clinical diagnoses, interventions, and outcomes; revenues and costs; and number and type of students educated at the centers. Plans are for a core group of nursing centers to purchase a common electronic health record to facilitate data aggregation.

DNPs must be able to articulate the needs for these types of data when informatics products are being acquired or designed for a healthcare facility. DNPs must be prepared to lead the process of selection and implementation of information technology products by being versed in the activities of the system's life cycle. They must understand the current evaluative literature on informatics implementation and outcomes. They must also know how to use informatics tools to manage and analyze the data for knowledge discovery.

To prepare DNPs for their important roles as stewards of healthcare data, information, and knowledge, we propose a required course for all DNPs, as well as the systematic integration of informatics knowledge across the curriculum. We believe these recommendations are consistent not only with the AACN Essentials document for DNP education, but also with the recommendations of the many authors who have studied and identified informatics competencies for nurses [12, 13, 14, 15, 16] and with the findings of the recent TIGER summit [17] on the use of informatics to transform nursing education and practice.

Informatics Course for DNPs

The DNP informatics course covers information systems and technology for improvement and transformation of healthcare. An example course description and objectives follow:

Course Description

The focus of this course is on the integration of informatics knowledge, skills, and attitudes to support culturally sensitive, evidence-based practice at a leadership level. Selected informatics topics relevant to evidence-based practice with varied populations are included, such as: 1) the development, use, and evaluation of computer systems for clinical practice, education, decision support, and shared clinical and educational decision-making; 2) standards in terminology, data storage, and transmission; 3) data capture, analysis, and application for quality improvement; 4) informatics as a fundamental tool for the creation of evidence; and 5) computer-aided instruction.

Course Objectives

At the completion of the course, the student will:

1) Understand processes associated with the development, use, and evaluation of clinical information systems:

   a) Understand types of computers, applications, and systems currently used and evolving in health care;

   b) Understand the life cycle, the requirements specification process, and the application to practice of information systems and the nursing leadership roles required to select, implement, maintain, and evaluate systems;

   c) Identify components of decision support and shared clinical decision-making needed to apply evidence to practice;

   d) Determine adequate evaluation methods for information systems;

   e) Understand how information technology can positively impact individual and population health care outcomes

2) Use informatics tools to record, retrieve, and critically analyze data, information, and knowledge.

   a) Record clinical data using accepted standardized terminologies to represent nursing-related data.

   b) Develop systems within the context of workflow.

   c) Structure and analyze complex clinical data, applying data-mining techniques and evidence-based standards.

d) Apply database reports to quality improvement processes.

3) Evaluate cultural, ethical, and legal implications of information technology in healthcare.

4) Evaluate electronic sources of consumer and professional health information.

5) Understand key elements of computer assisted instruction (CAI), eLearning, and informatics tools in the provision of education and support for nursing students and the general population.

6) Understand the current issues related to informatics and be able to articulate the visionary leadership role nursing must have to steer responses to these issues.

Course Assignments

Examples of course assignments include:

1) Informatics competency pre-test and post-test;

2) Use of standard office, clinical, and statistical software;

3) Use of databases to search professional literature and mine clinical data;

4) Evaluation of components of software applications, such as: user interface, integration of standardized terminology for nursing, electronic health records, electronic decision support; electronic prescribing, computerized provider order systems, personal health records;

5) Evaluation of consumer health websites;

6) Quality assessment using electronic encounter documentation;

7) Clinical portfolio development using electronic documentation;

8) Article critiques related to specific information technologies, the impact on workflow on implementation, or the concept of informatics as a tool for evidence based practice;

9) The development of a workflow and an evaluation of the strengths and weaknesses of the informatics tools to be used in the DNP Capstone project.

Informatics throughout the DNP Curriculum

DNP students will use a variety of information resources to retrieve data, information, and knowledge in all their courses. In epidemiology, statistics, and research courses students will use informatics tools to investigate population health and evaluate knowledge for evidence-based practice. Clinical courses in the DNP curriculum will apply point-of-care technologies for decision support and documentation. DNPs will explore strategies and techniques for sharing decision-making with patients and families, as well as for supporting patients and caretakers in using personal health records for health management. Adminstrative, clinical, and educational databases will be utilized in the pursuit of the Capstone project. Patient encounter data and quality improvement studies will enhance each student's practice portfolio. Informatics will be integral to teaching, learning, reporting, and practicing in DNP programs.

Conclusion

While it may be daunting to contemplate transformative revisions of curricula in established educational programs in medicine, nursing, and other practice disciplines, the advent of a new program offers opportunities to integrate informatics from the outset. Close collaboration between informatics experts and clinical practice experts is required to create a new generation of clinical leaders whose agility in informatics gives them the knowledge and evidence they need to improve health care.

References

1. American Association of Colleges of Nursing (AACN). Essentials of doctoral education for advanced nursing practice. Washington DC: AACN; 2006, p.3.

2. American Association of Colleges of Nursing. AACN position statement on the practice doctorate in nursing. Washington, DC: AACN. 2004 [cited 2007 Mar 14]. http://www.aacn.nche.edu/DNP/DNPPositionStatement.htm

3. Marion L., Viens D., O'Sullivan A., Crabtree K., Fontana S., & Price M. The practice doctorate in nursing: Future or fringe? Top Adv Prac Nurs, 2003; 3(2), online.

4. Shortliffe EH, Cimino JJ (Eds.) Biomedical Informatics: Computer applications in health care and biomedicine. 3rd edition. NY: Springer; 2006, p24.

5. Fulton JS, Lyon BL. The Need for Some Sense Making: Doctor of Nursing Practice. Online J Issues Nurs. 2005;10(3)

6. American Nurses Association. National Database of Nursing Quality Indicators. Washington DC: ANA; 2007 [cited 2007 Mar 14]. Available from: http://www.nursingquality.org/

7. American Nurses Association. Non-acute care nursing-sensitive indicators. Washington DC: ANA; 2007 [cited 2007 Mar 14]. Available from: http://nursingworld.org/pressrel/2000/pr0420.htm.

8. Jenkins M. Toward national comparable nurse practitioner data: proposed data elements, rationale, and methods. J Biomed Inf. 2003; 36(4-5): 342-350.

9. Horroks S, Anderson E, Salisbury C. Systematic review of whether nurse practitioners working in primary care can provide equivalent care to doctors. BMJ 2002;324:819-23.

10. Brown SA, Grimes DE. A meta-analysis of nurse practitioners and nurse midwives in primary care. Nurs Res 1995;44:332-39.

11. Pohl JM. Breer ML. Tanner C. Barkauskas VH. Bleich M. Bomar P. Fiandt K. Jenkins M. Lundeen S. Mackey TA. Nagelkerk J. Werner K. National consensus on data elements for nurse managed health centers. Nurs Outlook. 2006; 54(2): 81-84.

12. Staggers N, Gassert CA, Curran C. Informatics competencies for nurses at four levels of practice. J Nurs Educ. 2001; 40: 303-316.

13. Staggers N, Gassert C, Curran C. Informatics competencies for nurses at four levels of practice. J Nurs Educ. 2001; 40: 303-16.

14. Curran C. Informatics competencies for nurse practitioners. AACN Clinical Issues 2003; 14(3): 320-330.

15. Jenkins ML, Hewitt C, Bakken S. Women's Health Nursing in the Context of the National Health Information Infrastructure. JOGNN. 2006; 35(1): 141-150.

16. Desjardins KS, Cook SS, Jenkins M, Bakken S. Effect of an Informatics for Evidence-based Practice Curriculum on Nursing Informatics Competencies. Intl J Med Inf. 2005; 74: 1012-1020.

17. Technology Informatics Guiding Educational Reform (TIGER) summit [homepage on the Internet]. [cited 2007 Mar 14]. Available from: https://www.tigersummit.com/.