

PERCEPTIONS AND EXPERIENCES OF BACCALAUREATE NURSING PROGRAM  
LEADERS RELATED TO NURSING INFORMATICS

BY

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## Abstract

Nursing program leadership for integrating nursing informatics (NI) into curricula is essential. NI is a specialty that combines nursing science, computer science, and information science to manage health information and improve patient health outcomes (American Nurses Association, 2008). Approximately 98,000 patient deaths per year occur due to medical errors (Institute of Medicine, 1998). Management of patient health information using technology was identified as essential to minimizing errors and promoting patient safety, transforming the healthcare delivery system (U.S. Department of Health & Human Services, Office of the National Coordinator for Health Information Technology, 2015b). NI skills are necessary for all practicing nurses. Graduating nursing students, however, may not enter practice with sufficient NI skills to meet the demands of a technology-rich and information-saturated healthcare field (Choi & De Martinis, 2013). Nursing faculty have even been reported to be a barrier to students acquiring necessary NI skills (Curran, 2008).

This study assists in identifying the current state of NI in baccalaureate nursing education in one Midwestern state. Limited information addressing NI programming supports the need for further research. The purpose of this research was to examine baccalaureate nursing program leaders' perceptions and experiences related to NI in the nursing education setting. This qualitative descriptive study was conducted using focus groups with semi-structured interviews and written surveys. The sample included nine baccalaureate nursing program leaders in the state of Kansas, representing 53% of Kansas baccalaureate nursing programs. Research questions explored nursing program leaders' understanding and description of NI, its impact on curriculum, and associated challenges and success strategies with curricular integration.

Results of this study included two major categories addressing the research questions: challenges with curricular integration and success strategies for integrating NI into the curriculum. Participants identified challenges such as agreeing on a definition of NI, gaining resources, developing faculty, and encountering legal and ethical issues. Success strategies identified included determining NI needs for the curriculum and leadership roles and responsibilities. The written survey responses supported the two identified focus group categories.

Findings show that NI is an important part of the curriculum. Implications for nursing program leaders include guiding faculty in re-evaluating the curriculum according to current standards, accessing resources, and addressing confidentiality and social media issues. Further research is needed including gaining perspectives of nursing faculty and students.

*Keywords:* nursing, informatics, baccalaureate, education

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## **Chapter One: Background**

For a variety of reasons, it is essential that nursing faculty be proficient with nursing informatics (NI) knowledge and skills. Nursing informatics is “a specialty that integrates nursing science, computer science, and information science to manage and communicate data, information, knowledge, and wisdom in nursing practice” (American Nurses Association [ANA], 2008, p. 1). The goal of NI is to improve health outcomes by using technology to manage information (ANA, 2008).

Nursing informatics contributes to patient safety, the foundation of quality healthcare (Sewell, 2016). In 1998, the Institute of Medicine (IOM) captured national attention when it reported that approximately 98,000 patient deaths occur per year due to medical errors (IOM, 1998). Subsequently, the management of patient health information using health information technology (HIT) was identified as a major contributor to patient safety, transforming the healthcare delivery system (U.S. Department of Health & Human Services, Office of the National Coordinator for Health Information Technology [ONC], 2015b). Nursing informatics competencies became a necessity for all nurses in professional practice.

Nurse educators, proficient in NI, are needed in order to adequately prepare students with the NI knowledge and skills necessary in contemporary healthcare settings. Their program leaders are important in guiding program development and mentoring faculty. In 2014, approximately 112,000 nursing students graduated from over 800 baccalaureate nursing programs in the U.S. (American Association of Colleges of Nursing [AACN], 2015). These students were taught by over 17,000 full-time nursing faculty (Li & Fang, 2015). Nursing faculty leaders are challenged at this time to find new, creative ways to engage faculty in integrating nursing knowledge work into curricula to prepare future nurses. This has



implications for future nurses in bridging the patient-technology gap as well as working collaboratively with team members (National League for Nursing [NLN], 2015).

According to the literature, many nursing students are not entering nursing practice with sufficient NI knowledge and skills to meet the demands of a technology-rich and information-saturated healthcare field (Choi & De Martinis, 2013; Elder & Koehn, 2009; Fetter, 2009a; Fetter, 2009b). Literature indicates that nursing faculty, lacking background in NI, may even be a barrier to students acquiring necessary NI skills prior to entering professional practice (Curran, 2008).

The IOM called for the inclusion of informatics in health-related educational programs (IOM, 2003). The Quality and Safety Education for Nurses (QSEN) initiative explicated pre-licensure nursing competencies in six broad categories, including informatics. QSEN's action-oriented definition of NI directs nurses to "use information and technology to communicate, manage knowledge, mitigate error, and support decision-making" (Cronenwett et al., 2007, p. 129). In 2008, publications by three nursing organizations, the NLN (2008a), AACN (2008), and ANA (2008), provided the framework for inclusion of informatics in the baccalaureate nursing education curriculum.

Nursing informatics is an important but relatively new concept in healthcare. Challenges in understanding and implementing NI in nursing education programs exist. Limited understanding of the definition of NI, multiple definitions of NI across organizations, and different types of informatics create uncertainty when integrating NI knowledge and skills into the nursing education curriculum. These initiatives make clear the necessity for all health care providers to gain competence in NI.

In this introductory section, the following topics are addressed: (a) the historical background on informatics, (b) the historical background on informatics in nursing education, (c) the model framework, and (d) the study purpose, research questions, significance, assumptions, and definition of terms.

### **Historical Background on Informatics**

The 1998 IOM report stimulated government action to improve patient safety (IOM, 1998). Multiple pieces of federal legislation were passed, setting in motion the use of HIT to manage patient health information.

In 2004, President G.W. Bush called for adoption of EHRs by 2014. In addition, the Office of the National Coordinator for Health Information Technology was formed (ONC; Sewell, 2016). The ONC's current Federal Health IT Strategic Plan 2015-2020 describes five goals to improve health, health care, and decrease health care costs by using information and technology (U.S. Department of Health & Human Service, ONC, 2015b).

In 2009, President Obama signed the American Recovery and Reinvestment Act (ARRA) into law, mandating the conversion of paper-based health records to electronic format (Civic Impulse, 2016). An outgrowth of ARRA, the Health Information and Technology for Clinical Health (HITECH) Act of 2009 specified the adoption and meaningful use of EHRs (U.S. Department of Health & Human Services, healthit.gov, 2016). Meaningful use refers to using information from EHRs to improve healthcare delivery (Blumenthal & Tavenner, 2010; Centers for Disease Control, 2016).

These mandates make clear the necessity for all practicing nurses to be competent in NI knowledge and skills. The nursing profession responded with guidelines for inclusion of NI into the nursing curriculum.

## **Historical Background on Informatics in Nursing Education**

Healthcare delivery, including nursing practice, was transformed by the implementation of federal laws mandating the use of health information technology to increase patient safety and quality of care. In response, multiple national initiatives addressed the inclusion of nursing informatics in the nursing education curriculum.

Although seminal work in NI was occurring in the early 1980s, it was over 20 years later that national attention to patient safety established NI as an integral part of nursing education. In 2003, the IOM released a report calling for all health professions education programs to include informatics as a core competency (IOM, 2003). In 2006, the Technology Informatics Guiding Education Reform (TIGER) initiative recommended specific informatics competencies for practicing nurses and recommended these competencies be taught in the nursing curriculum (Gugerty & Delaney, 2009).

Shortly thereafter, the Robert Wood Johnson Foundation (RWJF) funded an initiative called the Quality and Safety Education for Nurses (QSEN). Based on the 2003 IOM report, QSEN delineated six competencies that all practicing nurses should demonstrate: patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics. Each QSEN competency listed knowledge, skills, and attitudes expected of students to provide safe, quality patient care at the pre-licensure and graduate nursing education levels. The informatics competency charged all nurses to “use information and technology to communicate, manage knowledge, mitigate error, and support decision-making” (Cronenwett et al., 2007, p. 129).

In 2008, three nursing publications provided the framework for inclusion of informatics in the baccalaureate nursing education curriculum: a position statement by the NLN (2008a),

*The Essentials of Baccalaureate Education for Professional Nursing Practice* (AACN, 2008), and the ANA's *Nursing Informatics: Scope and Standards of Practice* (ANA, 2008). Nursing program leaders and their faculty began the task of translating these guidelines into specific goals, objectives, and student learning outcomes in the curriculum.

### **Model Framework**

The core of nursing informatics is the evolution of data and information into knowledge and wisdom, and incorporates the technology that manages these processes (ANA, 2008). The DIKW (data-information-knowledge-wisdom) framework illustrates these four, overarching concepts (Matney, Sward, & Staggers, 2011; see Appendix A).

The DIKW framework includes four concepts which support the construction of nursing knowledge and the role of nursing informatics in managing nursing knowledge (Matney, Sward, & Staggers, 2011). The first three of the four concepts in the framework, data, information, and knowledge, were first included in the definition of NI by Graves and Corcoran (1989). Each subsequent concept in the framework is more complex than the prior concept. Data are symbols, such as numbers or words with no context added (i.e. the number 170). A piece of datum is meaningless without a descriptor. Information is data with meaning attached (i.e. 170 heart beats per minute). Knowledge is constructed when relationships among information are synthesized. A competent nurse knows that a heart rate of 170 beats per minute is too rapid for an adult and needs specific interventions to help control the rate and associated signs and symptoms.

The ANA added the concept of wisdom in its definition of NI in 2008 (ANA, 2008). Wisdom, the most complex concept in the framework, includes the synergistic relationship between nursing knowledge, experience, and intuition. For example, an experienced nurse may observe a patient's appearance and behavior and sense that something isn't "right" with the

patient. Based on previous experience, the experienced nurse will consider possible causes for the signs and symptoms and perform interventions, such as checking the patient's vital signs, to identify the cause.

Health information technology uses information processes designed to transform data into wisdom. Health information technology collects, stores, and processes data, information, knowledge, and wisdom, assisting nurses in evidence-based, clinical decision-making.

Different types of HIT facilitate the process of data into wisdom (see Appendix A). For example, health information systems collect, organize, and interpret data at the data-to-information level. At the information to knowledge level, clinical decision support systems (CDSS) are designed to assist a professional who must decide what actions to take in a given clinical setting. An example of a CDSS is a clinical pathway, rule-based recommendations for patient care interventions based on a specific diagnosis (De Bleser et al., 2006). Expert systems connect knowledge and wisdom. An expert system is an alert system that draws attention to, for example, medication interactions or abnormal lab results. An expert system may also suggest appropriate treatments for a diagnosis specific to an individual (ANA, 2008).

### **Problem Statement**

The value of informatics in healthcare continues to emerge. National initiatives related to NI necessitate that nurse educators be proficient in NI knowledge and skills. However; nursing literature indicates that many nursing faculty are perceived as lacking necessary NI knowledge and skills (McNeil et al., 2005; Nguyen, Zierler, & Nguyen, 2011; NLN, 2008b; Smith, Cronenwett, & Sherwood, 2007).

One contributing factor is limited understanding of the definition and scope of nursing informatics. For example, faculty may place undue emphasis on computer literacy (McNeil et

al., 2006; Rajalahti, Heinonen, & Saranto, 2014; Thompson & Skiba, 2008) or have an unclear understanding of computer literacy, information literacy, and information management, major components of NI (Dixon & Newlon, 2010; Hebda & Calderone, 2010; Nelson & Stagers, 2008). In addition, faculty report multiple challenges pertaining to acquiring and maintaining NI competency and incorporating NI into the nursing education curriculum (Kowitlawakul et al., 2014; Pramila, 2013).

### **Purpose of the Study**

The purpose of this qualitative descriptive study was to examine baccalaureate nursing program leaders' perceptions and experiences related to nursing informatics in the nursing education setting. Areas examined in this study included nursing program leaders' understanding and description of NI and its importance in the nursing curriculum, challenges to incorporating NI in the nursing curriculum, and success strategies for integrating NI into the nursing curriculum.

### **Research Questions**

The research questions guiding this study were:

- What are BSN program leaders' understanding and description of nursing informatics and its importance in the nursing education curriculum?
- What do BSN program leaders perceive as challenges to integrating nursing informatics in the nursing education curriculum?
- What strategies and successes do BSN programs leaders describe related to integrating nursing informatics into the nursing education curriculum?

## **Significance of Study**

This study examined the perceptions and experiences of baccalaureate nursing program leaders related to NI. The results of this study informed key stakeholders in nursing education and nursing practice of the current state of NI in the nursing education setting. Challenges with integrating NI in the nursing education curriculum were identified. Identifying these challenges may assist nursing program leaders in providing appropriate support and resources to nursing faculty. In addition, areas where further research is needed related to NI were identified.

## **Assumptions**

The researcher assumed that study participants were willing to share personal perceptions of and experiences with NI in a group setting. The researcher also assumed that participants openly, honestly, and accurately shared positive and negative perceptions and experiences with NI.

## **Definition of Terms**

**Academic EHR (AEHR).** Fully functional systems through which students can navigate technology and document and plan patient care in a simulated format (Gardner & Jones, 2012).

**Clinical decision support system (CDSS).** A computer-based system that facilitates human decision-making, often through a set of rules to analyze data and make recommendations (ANA, 2008).

**Electronic health record (EHR).** A repository of electronically maintained information about an individual's health status and health care, stored such that it can serve the multiple legitimate users of the record (AMIA, 2016a, para. 23).

**Expert system.** The most common type of CDSS that uses individual patient data to reason, draw conclusions, and make recommendations about a patient's care (Coiera, 2003). Expert systems rely on the wisdom of the user to apply the recommendations (ANA, 2008).

**Health information management (HIM).** The practice of acquiring, analyzing, and protecting digital and traditional medical information vital to providing quality patient care (AMIA, 2016b, para. 20).

**Health information system.** A technological system that collects, organizes, and processes health information (ANA, 2008).

**Health information technology.** A variety of technologies used to store, analyze, and share health information (U.S. Department of Health & Human Services, HealthIT.gov., 2013).

**Informatics.** The discipline focused on the acquisition, storage, and use of information in a specific setting or domain (Hersh, 2009).

**Nursing informatics competency.** Adequate knowledge, skills, and abilities to perform specific informatics tasks. The three categories of NI competencies are basic computer skills, more commonly known as computer literacy, information literacy, and information management (Hebda & Calderone, 2010).

**Nursing informatics.** Nursing informatics is a specialty that integrates nursing science, computer science, and information science to manage and communicate data, information, knowledge, and wisdom in nursing practice (ANA, 2008).

**Nursing program leader.** A nursing program leader is considered a dean, director, or chairperson of a baccalaureate nursing education program.

**Workaround.** Workaround behaviors are those that circumvent or temporarily fix an evident or perceived workflow block (Debono, 2013).



**Summary**

Chapter One has introduced the topic of the research study, historical background of NI, and a model framework important to understanding NI. In addition, the research study problem, purpose, questions, and study significance were described. In concert with the literature review that follows, the case is made that further study at the descriptive level is indicated.

## **Chapter Two: Review of the Literature**

Literature related to the topic of NI is in a relatively young stage, especially related to nursing education. This chapter will provide the current background of the literature that led to the need for this study. The literature review for the research study is organized into seven sections: (a) Informatics Conceptual Definitions and Descriptions, (b) Major Components of Nursing Informatics, (c) Nursing Informatics Competencies, (d) Existing Nursing Informatics Competencies for Students and Faculty, (e) Broad Categories of Nursing Informatics Research, (f) Benner's Theory and Studies of Faculty Informatics Competencies, and (g) Studies of Informatics Competencies in Other Health-related Disciplines.

### **Literature Search**

A literature search for all English-language studies on perceptions and experiences of nursing faculty and other health-related professions related to informatics was conducted. Databases searched for the literature review included: CINAHL, ProQuest Dissertations & Theses, PubMed, Google Scholar, ERIC, Nursing and Allied Health Source, and OTSeeker. Keywords searched were “nursing,” “informatics,” “competency(ies),” “faculty,” and “education.” Additional keywords were “medicine,” “occupational therapy,” “pharmacy” and “physical therapy.”

Date delimitations for the nursing research literature search were 2002, the year Stagers, Gassert and Curran (2002) published their seminal study identifying NI competencies, to the present. Inclusion criteria were original research studies in peer-reviewed journals that included, but were not limited to, the perceptions and experiences of nursing program leaders and nursing faculty related to NI.

As health professions education moves to an interprofessional focus, it is important to understand the status of informatics in diverse health professions. Inclusion criteria to gain this literature were original research studies in peer-reviewed journals from medical, occupational therapy, pharmacy, and physical therapy disciplines that included student or faculty experiences with informatics competencies or information technology. Date delimitations for the research literature were 2008 to 2016. No research literature related to student or faculty experiences with informatics competencies or information technology was located beyond medicine and pharmacy.

### **Informatics Conceptual Definitions and Descriptions**

This section includes an overview of the evolution of NI definitions, differentiates types of informatics, and describes NI's major components. It is important to understand these elements so that NI knowledge and skills required by current practice demands can be effectively integrated into the nursing curriculum. The headings discussed in this section are: (a) generic informatics definition, (b) types of healthcare-related informatics, (c) nursing informatics definitions, (d) major components of nursing informatics, and (e) nursing informatics competencies.

**Generic informatics definition.** The term “informatics” originated in the 1950s and refers to the automatic processing of information (Pramilaa, 2013). Informatics is defined by Hersh (2009) as the “discipline focused on the acquisition, storage, and use of information in a specific setting or domain” (para. 4). This differentiates informatics from computer science and information science by the field to which it is referred, for example, medical informatics. This definition of informatics emphasizes information as the core component of informatics rather than emphasizing computer technology. These assertions are supported by Friedman’s

“fundamental theorem” of biomedical informatics. Friedman states that a synergistic effect occurs when individuals use technology to process information; knowledge acquisition is then greater for these people than for individuals who are not assisted by technology (Friedman, 2009).

**Types of healthcare-related informatics.** There are multiple categories and subcategories of informatics across health-related disciplines. Informatics specifically related to healthcare include, but are not limited to: (a) biomedical informatics, (b) health informatics, (c) clinical informatics, (d) applied informatics, (e) public health informatics, and (f) informatics in specialty health care areas (i.e. nursing, medicine, occupational therapy, physical therapy). Multiple terms perpetuate confusion about informatics, more specifically, what constitutes NI and its relationship to other types of informatics.

Various types of informatics can be categorized in a hierarchal structure (see Appendix B). The apex of the health-related informatics hierarchy is *biomedical informatics*. The American Medical Informatics Association (AMIA) and the American Health Information Management Association (AHIMA) jointly defines biomedical informatics as “the interdisciplinary field that studies and pursues the effectiveness of biomedical data, information, and knowledge for scientific inquiry, problem solving, and decision making, motivated by efforts to improve human health” (AHIMA, 2012, para. 4). *Biomedical informatics* is considered the basic science of health-related informatics. Biomedical informatics encompasses the science and research of the molecular and cellular level of individuals (*bioinformatics*), the system health of individuals (*clinical informatics*), and health of populations and societies (*public health informatics*).

Clinical informatics and public health informatics are considered part of *health informatics*. Clinical informatics, also known as *applied informatics*, is defined as “the application of informatics and information technology to deliver health care services” (AMIA, 2016c, para. 1). *Nursing informatics* is one of the many health-related disciplines that is a type of clinical, or applied, informatics.

While informatics in health-related disciplines appear as distinct types of informatics, some informatics knowledge and skills in each discipline are similar and overlap to some degree. For example, professionals from multiple disciplines such as medicine, nursing, and allied health enter, access, and use patient information in a health information system to provide interprofessional, holistic care.

**Nursing informatics definitions.** Since the early 1980s, multiple definitions of NI were developed. Sewell and Thede (2011) documented over 20 definitions of NI encompassing the last 35 years. Multiple definitions of NI over time are contributing factors to the discrepancy in nurse educators’ understanding of NI. After three decades of NI development, there is no one nationally-recognized definition of NI.

Staggers and Thompson (2002) published an article describing the major periods of change in the focus of NI definitions: (a) information technology-oriented, (b) conceptually-oriented, and (c) role-oriented. The changing focus of NI demonstrates the progression of the NI field. In the earliest years of NI, the use of computers in healthcare was in its infancy. As the complexity and capabilities of computers grew, focus shifted from the technology used to manage information to the role of information in nursing’s expanding knowledge base and evidence-based practice. As NI permeated all areas of nursing and became recognized as a specialty, the need for NI experts became evident in NI definitions.

**Information technology-oriented definitions.** Scholes and Barber (1980; as cited in Sewell & Thede, 2011) developed the first recognized definition of NI, “the application of computer technology to all fields of nursing—nursing service, nurse education, and nursing research” (para. 15). This definition and others focused on computer technology with little emphasis on information, the nucleus of informatics.

Schwirian (1986) introduced a pyramidal model that shifted the focus of NI from computer technology to the information managed by technology. Schwirian’s model identified a relationship between four key components: (1) *raw material* (i.e. information), the base; (2) *technology* (i.e. the support tool to manage information), the second layer; (3) the *users* of the information (i.e. nurses), the third layer; and (4) the *goal* for using the information (i.e. patient outcomes), the apex. The concepts in this model prompted conceptually-oriented definitions of NI (Staggers & Thompson, 2002).

**Conceptually-oriented definitions.** Graves and Corcoran (1989) proposed the first definition of NI that changed the focus from information technology to a conceptual orientation, including “a combination of computer science, information science, and nursing science designed to assist in the management and processing of nursing data, information, and knowledge to support the practice of nursing and the delivery of nursing care” (p. 227). As noted, the term *informatics* can apply to multiple, diverse professions. Computer science and information science are common elements of informatics in all professions. This definition recognized nursing as a science with its own body of information to manage (Staggers & Thompson, 2002).

The Graves and Corcoran (1989) definition also introduced the data-information-knowledge conceptual framework. As discussed in Chapter 1, these concepts

represent the role of NI in the construction and management of nursing knowledge, with the transformation of data to knowledge. The 2008 ANA definition of NI added the concept of *wisdom* to the data-information-knowledge framework: Nursing informatics is “a specialty that integrates nursing science, computer science, and information science to manage and communicate data, information, knowledge, and wisdom in nursing practice” (ANA, 2008, p. 1).

**Role-oriented definitions.** In 1992, the ANA (as cited in Sewell and Thede, 2011) constructed its first definition of NI based on Graves and Corcoran’s (1989) definition, but also recognized NI as a nursing specialty and a new role in NI, the informatics nurse specialist (ANA, 1992).

This historical section emphasizes the newness of the NI concept. This section also helps explain why some educators may lack expertise for teaching nursing informatics.

### **Major Components of Nursing Informatics**

This section includes a discussion of the three major sciences that constitute nursing informatics: (a) nursing science, (b) computer science, and (c) information science. Knowledge and skills from all three sciences have been used in development of NI competencies, discussed later in this section.

**Nursing science.** According to Daly et al. (1997), nursing science is “an identifiable, discrete body of knowledge comprising paradigms, frameworks, and theories” (p. 10). Multiple paradigms, frameworks, and theories offer different perspectives of nursing science. However, all contain four concepts integral to nursing: (a) human being, (b) environment, (c) health, and (d) nursing (Fawcett, 1984). The nursing process (assessment, diagnosis, outcomes identification, planning, implementation, evaluation), is the framework by which nurses gather

data to make clinical decisions and contribute to the body of nursing knowledge through evidence-based practice (ANA, 2008).

**Computer science.** Computer science involves the “study of the principles and use of computers” (“Computer science,” 2016). There are two major categories of computer technology in health care, direct patient care technologies and HIT. Direct patient care technologies include biomedical devices that measure or monitor an individual’s physiological functions, such as an oxygenation saturation monitor or a heart monitor recording an individual’s heart rate and rhythm (Waltz, Strickland, & Lenz, 2010). Health information technologies are those used the management of health information, which includes the storage, analyzing, and sharing of health information (U.S. Department of Health & Human Services, HealthIT.gov., 2013). Examples of HIT include the electronic health record (EHR) and clinical decision support systems (CDSS).

**Information science.** Information science is the collection, classification, storage, retrieval, and dissemination of recorded knowledge (“Information science,” 2016). In nursing practice, for example, patient data and information is collected and stored in the EHR. This information can be retrieved and aggregated with other patients’ information to produce knowledge which guides evidence-based practice decisions.

Knowledge and skills from all three major sciences are integral to NI. Knowledge and skills from information science demonstrate how content knowledge from nursing science is managed, and by what means, technology (computer science).

### **Nursing Informatics Competencies**

Nursing informatics competencies are the knowledge and competencies necessary for nurses to effectively manage knowledge (Gugerty & Delaney, 2009). Nursing informatics



competencies include three major components: (a) computer literacy, (b) information literacy, and (c) information management (AACN, 2008; Hebda & Calderone, 2010).

**Computer literacy.** Computer literacy involves familiarity with computer technology and the use of its software. This would include, for example, using databases (Hebda & Calderone, 2010).

**Information literacy.** Information literacy is “a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (American Library Associations, Association of College & Research Libraries, 2016, para. 1). An example of demonstrating information literacy is searching databases for evidence-based practice guidelines.

**Information management.** Health information management is defined as the “practice of acquiring, analyzing, and protecting digital and traditional medical information vital to providing quality patient care” (American Medical Informatics Association, 2016b, para. 29). Examples of information management include using passwords to protect patient data, entering patient data into the health information system, and using aggregated patient data to make quality improvement decisions.

The three concepts, computer literacy, information literacy, and information management, have been used by multiple organizations in developing NI competencies. Examples of organizations with NI competencies include AACN (2008), ANA (2008), TIGER (Gugerty & Delaney, 2009), and QSEN (Cronenwett et al., 2007).

### **Existing NI Competencies for Students and Faculty**

Undergraduate nurse educators are responsible for adequately preparing nursing students to enter professional nursing practice competent in nursing informatics. Nursing faculty must

also be adequately prepared and proficient in nursing informatics if they are to teach their students to be competent.

The following headings are used to further clarify the status of competencies in nursing informatics: (1) Seminal NI competencies study, (2) Technology Informatics Guiding Education Reform (TIGER) Initiative, (3) Quality and Safety Education for Nurses (QSEN), (4) American Association of Colleges of Nursing (AACN) *The Essentials of Baccalaureate Education for Professional Nursing Practice*, (5) American Nurses Association (ANA), and (6) Updated NI competencies studies.

**Seminal study.** In the seminal study by Stagers, Gassert, and Curran (2002), the researchers identified 304 NI competencies in three categories of knowledge, skills and attitudes: (a) computer skills, (b) informatics knowledge, and (c) informatics skills. Competencies were also leveled into four distinct skills levels: (a) beginning nurse, (b) experienced nurse, (c) informatics nurse, and (d) informatics innovator.

**Technology Informatics Guiding Education Reform (TIGER) Initiative.** The purpose of the TIGER Initiative is to provide nurses with informatics skills in nursing practice, leadership, and education (Hebda & Calderon, 2010). Specific to nursing education, TIGER promotes inclusion of nursing informatics competencies into all levels of nursing education and practice and faculty development in NI. TIGER's informatics competencies are divided into three categories: (a) basic computer competencies, (b) information literacy, and (c) information management (Gugerty & Delaney, 2009; see Appendix C).

**Quality and Safety Education for Nurses (QSEN).** The primary goal of QSEN is to develop the knowledge, skills, and attitudes (KSAs) of pre-licensure and graduate nursing students to promote quality and safety in nursing practice. The QSEN competencies categories

include patient-centered care, teamwork and collaboration, evidence-based practice (EBP), quality improvement (QI), safety, and informatics. QSEN defines informatics as “the use of information and technology to communicate, manage knowledge, mitigate error, and support decision-making” (Cronenwett et al., 2007, p. 129; see Appendix D).

**American Association of Colleges of Nursing (AACN) *The Essentials of Baccalaureate Education for Professional Nursing Practice*.** This publication describes program outcomes in nine “essential” curriculum content areas, including informatics, for students graduating from baccalaureate nursing programs. Essential IV: Information Management and Application of Patient Care Technology delineates 12 knowledge, skills, and attitudes related to information and technology (AACN, 2008; see Appendix E).

**American Nurses Association (ANA).** A competency matrix, the Functional Area-Competency Framework, identifies informatics competencies for three categories, computer literacy, information literacy, and professional development/leadership (includes safety, management, and ethical issues in informatics). Competencies are based on and leveled according to Staggers, Gassert, and Curran’s (2002) study. Competencies are also categorized by function, including education and professional development (ANA, 2008; see Appendix F).

**Updated studies.** Two, subsequent studies updated the work by Staggers et al. (2002). In a Delphi study by Chang, Poyton, Bassert, and Staggers (2011), nurse educators and nursing administrators validated 42 new informatics competencies. New computer competencies reflected advances in computer technology, for example, the “use of clinical decision support tools” (beginning nurse level) and “applications to aggregate, analyze, and present data” (experienced nurse level). In addition, the new competencies emphasized information literacy and information management skills, such as “understanding and applying essential

information-seeking concepts and practices” (beginning nurse level) and “using data and statistical analyses to describe and evaluate practice” (experienced nurse level). Hart (2010) conducted a Delphi study which formulated a job-specific list of core informatics competencies for clinical nurse managers, extracted from the master competency list by Staggers et al. (2002).

Currently, no nationally-standardized informatics competencies exist for nurses in professional practice, nursing students, or nurse educators. However; nursing researchers, national initiative groups, and multiple organizations have published recommended NI competencies. While no lists of recommended competencies are identical, all share common characteristics of computer technology, information literacy, and information management competencies. Belchez (2016) illustrated these similarities with a crosswalk of NI competencies completed by the AACN (2008), ANA (2008), TIGER (Gugerty & Delaney, 2009), and QSEN (Cronenwett et al., 2007). These organizations provide nurse educators with initial direction for curricular integration.

Belchez (2016) also reported a review of Kansas City Metro programs to determine the extent that informatics was included in their pre-licensure baccalaureate programs. Using school websites, schools of nursing curricula were reviewed to determine if informatics was included in any course titles. Of the 12 nursing programs reviewed, only two indicated offering a course with a focus on NI. This supports a need for further curricula work to attain informatics competencies.

### **Broad Categories of Nursing Informatics Research**

**Studies of faculty and student perceptions and experiences.** The studies in this section address the perceptions and experiences of nursing faculty and future nurse educators about information technology and challenges with NI. Results of these studies are beneficial in

recognizing knowledge gaps and potential faculty development needs related to NI. In addition, challenges to NI in the nursing education setting identified in the studies can assist nursing leadership in recognizing faculty resources needed to implement NI in the curriculum.

In a study of perceptions and experiences with an academic EHR program (Kowitlawakul, Chang, Wang, & Wang, 2014), nurse educators perceived this information technology tool as challenging to learn, but a valuable learning tool for students. Providing adequate time to implement the program and administrative support was reported as necessary. Requiring competency in NI and including faculty development for NI was suggested.

Faculty also face challenges with nursing informatics. Dixon and Newlon (2010) conducted a simulation study to examine how PhD nursing students, consisting of current and future nurse educators, perceived informatics and its core components. Students were asked to simulate a plan for informatics integration into an undergraduate nursing program. Results showed that the students did not have clear idea about what nursing informatics was or what informatics competencies were needed by undergraduate nursing students. Students identified only seven of 14 computer and information literacy categories identified by the ANA (2008) and TIGER (Gugerty & Delaney, 2009). Most competencies identified were computer-related rather than information-related.

In addition to a lack of clarity about NI, faculty face other challenges related to NI. Integration of NI content into the curriculum can be challenging because of inadequate resources such as technology (Pramilaa, 2013) and increased workloads, decreasing time available for integrating informatics content into the curriculum (Kowitlawakul et al., 2014). Faculty state that leadership support is paramount to successful integration of NI content in the curriculum.

Overall, faculty were positive about specific HIT available to provide students simulated experiences with NI; however, some faculty were not knowledgeable about what NI was or how to integrate it into the nursing curriculum. Faculty addressed multiple challenges to integrating NI into the nursing curriculum. Based on the outcome of these studies, further research on leadership support and faculty development needs are warranted.

### **Benner's Theory and Studies of Faculty Informatics Competencies**

Most studies located in the nursing research literature were based on identifying faculty NI competency levels based on Benner's Novice-to-Expert Theory (Benner, 1982). Key concepts in Benner's Novice-To-Expert Theory are *experience* and *competency*. Benner's theory emphasizes knowledge and skills developed through practical experience and include five levels of professional performance: (a) novice, (b) advanced beginner, (c) competent, (d) proficient, and (e) expert. Benner's theory has also been studied with professional development of nurse educators (Ramsburg & Childress, 2012).

Many of these competency studies were stimulated by the IOM reports addressing patient safety (IOM, 1998; IOM, 2011) and subsequent initiatives to develop NI competencies for nursing practice and in nursing education (AACN, 2008; ANA, 2008; Gugerty & Delaney, 2009; Cronenwett et al., 2007). For example, Hartman, Dziuban, and Brophy-Ellison (2007) stated that while faculty may be considered experts in their fields, faculty may be novices when encountering unfamiliar information technology.

Nguyen, Zierler, & Nguyen (2011) found that two-thirds of 193 surveyed nursing faculty felt "competent" using information technology. However, McNeil et al. (2005) stated that 86% of 266 nursing program representatives (174 nursing leadership positions; 74 nursing faculty)

reported two-thirds of nursing faculty were perceived as novices (18%), advanced beginners (39%), or competent (29%) in demonstrating and teaching NI competencies.

Smith, Cronenwett, and Sherwood (2007) surveyed 195 representatives (88% nursing leadership positions; 12% faculty or “other”) from member schools of the AACN to determine the current states of prelicensure education related to the six QSEN competencies. One of the research questions asked “what is the perceived level of faculty preparedness to teach each competency?” Related to the QSEN competency, informatics, slightly over half of the respondents rated faculty expertise as “intermediate/some comfort” related to informatics. However, of the six QSEN competencies, only evidence-based practice (11%) and informatics (27%) had greater than 10% of program respondents rating the faculty as “novice/uncomfortable” with informatics.

A national survey conducted by the NLN (2008) asked nursing faculty and administrators who belonged to NLN at all levels of nursing education (LPN, diploma, ADN-RN, BSN-RN, and graduate level nursing programs) to self-rate their informatics knowledge and skills. Of the 1,557 faculty respondents, 494 faculty (31%) taught in baccalaureate nursing programs. Across representation from all types of programs, faculty rated themselves as “novice” (13%), “advanced beginner” (26%), “competent” (37%), and “expert” (4%).

Across all studies ranking nursing faculty’s NI competency levels, a majority of respondents rated nursing faculty as advanced beginners (Nguyen, Zierler, & Nguyen, 2011) or as having average (competent; intermediate/some comfort) abilities (NLN, 2008b; Smith, Cronenwett, & Sherwood, 2007). In addition, faculty in BSN or higher nursing education programs reported higher informatics competency levels than those in technical or associate

degree nursing programs (Nguyen, Zierler, & Nguyen, 2011; Thompson & Skiba, 2008; Smith, Cronenwett, & Sherwood, 2007).

According to the studies discussed, nursing faculty are perceived to be primarily average or below average in NI competencies. These results support the need for further exploration of program challenges and strategies for gaining faculty expertise and teaching plans related to NI.

### **Studies of Informatics in Other Health-related Disciplines**

Safe, quality healthcare delivery depends on interprofessional collaboration between multiple healthcare disciplines, such as medicine, pharmacy, nursing, occupational therapy, and physical therapy. This interprofessional approach is advocated by the IOM (2003). While all healthcare disciplines have their own domains of knowledge and skills that make each unique, the management of health-related information using information technology to improve patient outcomes is similar across disciplines. Students and faculty in other health-related disciplines encounter similar teaching and learning issues with informatics. This section discusses examples of informatics research in medicine and pharmacy within the past 10 years.

**Medicine.** Hersh et al. (2014) used an action research method with five physician faculty members to develop 13 broad informatics competencies for undergraduate medical education. Learning objectives were developed for each competency category and leveled as to when each competency should be introduced in the medical education curriculum.

A case study by Richardson, Bouquin, Tmanova, and Wright (2015) examined perceptions of 72 first-year medical students' familiarity with information literacy resources, using EHRs, and using medically-oriented databases. The majority of students (72%) reported they used the Internet at least daily for biomedically-related research with the most search database being PubMed. Not quite half (46%) of students had seen an EHR. Sixty percent of



students reported being “proficient” in the use of spreadsheets, but “novices” in skills including, but not limited to, databases and statistical software.

**Pharmacy.** In a study by Fox, Karcher, Flynn, and Mitchell (2008), 36 pharmacy syllabi were examined for the presence of pharmacy informatics content. Less than half ( $n = 14$ ) of the 36 syllabi contained pharmacy informatics content as defined by Accreditation Council for Pharmacy Education (ACPE). Pharmacy programs were teaching information system approaches, related to medication management, to improve medication-related patient health outcomes. However, some confusion between pharmacy informatics and a subcomponent, retrieving and providing evidence-based drug information existed.

Based on the literature from medical and pharmacy fields, it appears that some students are not being exposed early to EHRs in their educational programs (Richardson, Bouquin, Tmanova, & Wright, 2015). Similar to the literature in nursing, there is some confusion about what constitutes informatics (Fox, Karcher, Flynn, and Mitchell, 2008). However, medical and pharmacy professions are at least beginning to incorporate and level informatics content into their curricula (Fox, Flynn, Fortier, and Clauson, 2011; Fox, Karcher, Flynn, & Mitchell, 2008; Hersh et al., 2014).

## **Summary**

As nursing’s knowledge base expands, health information technologies evolve, and professional practice expectations increase, expectations for nurses graduating with NI knowledge and skills continue to grow. As previously noted, literature indicates that graduates of nursing education programs are not entering professional practice adequately prepared with NI competencies (Choi & De Martinis, 2013; Elder, 2009; Fetter, 2009a; Fetter, 2009b). Limited faculty understanding of NI and limited experience teaching informatics may be a barrier

attributed to students' lack of preparation (Curran, 2008). The literature indicates that the NI competency level of nursing faculty and preparation for teaching NI may need further development (Nguyen, Zierler, & Nguyen, 2011; NLN, 2008; Smith, Cronenwett, & Sherwood, 2007).

Nursing research indicates a need for greater understanding of how nursing programs can respond to better preparing graduates related to NI knowledge and skills. Nursing program leaders are particularly important in leading change. There is little research that examines the perceptions and experiences with NI in nursing education programs from the perspectives of nursing program directors. This study examined the perceptions and experiences of baccalaureate nursing program leaders related to NI challenges and strategies in nursing education to help update existing research. Recommendations for future research in this area were also discussed.

### **Chapter Three: Methods**

A qualitative descriptive design was used in this research study to describe the perceptions and experiences of baccalaureate nursing program leaders related to NI in the nursing education setting. A written survey and a focus group method were the approaches used in this study. These approaches allowed the student researcher to gain insight into the phenomenon of interest, nursing informatics, from the perspectives of nursing program leaders. This section describes the study methods: (a) purpose, (b) research questions, (c) design, (d) sample, (e) setting, (f) data collection methods, (g) ethical considerations, (h) data analysis method, (i) trustworthiness, and (j) researcher background.

#### **Purpose and Research Questions**

The purpose of this study was to examine baccalaureate nursing program leaders' perceptions and experiences related to nursing informatics in the BSN education curriculum. The research questions for this study were:

- What are BSN program leaders' understanding and description of nursing informatics and its importance in the nursing education curriculum?
- What do BSN program leaders perceive as challenges to integrating nursing informatics in the nursing education curriculum?
- What strategies and successes do BSN programs leaders describe related to integrating nursing informatics into the nursing education curriculum?

#### **Research Design**

The study design selected for this study was a qualitative descriptive design. The qualitative research paradigm views reality as interpretive through the context of an individual's experiences, with meaning constructed from those experiences (Mills & Burks, 2014).

Qualitative descriptive studies are used when straight, rich descriptions of the phenomenon of interest are desired, without the researcher attempting to derive deeper meaning from the responses (Sandelowski, 2000).

Qualitative research allows study participants to provide in-depth perspectives of their knowledge and experiences, adding to the researcher's understanding of the phenomenon of interest (Patton, 2015). In a relatively new field of study, such as nursing informatics, qualitative research data provides detailed descriptions to add to the field's domain of knowledge. In addition, experiences related to the field are described within the societal, cultural, and social contexts in which they occur. Quantitative research limits study participants to numerical responses that restrict the amount and depth of information that can be obtained (Patton, 2015).

The philosophical framework for this research study was naturalistic inquiry. In naturalistic inquiry, the researcher studies a phenomenon and population of interest in a natural setting and state of being. Study data is allowed to flow unrestricted from the context of an individual's perceptions and descriptions of experiences related to the phenomena of interest. In contrast to quantitative research methodologies, naturalistic inquiry does not specify a theoretical background or pre-determine, measure, or manipulate study phenomena (Sandelowski, 2000).

### **Sample and Setting**

A purposive sample was used for this study. Purposive sampling allows the researcher to select study participants who meet desired criteria for providing thick and information-rich data related to the phenomenon of interest (Patton, 2015). Inclusion criteria for participants in the study included current, full-time nursing program leaders (i.e. deans, directors, chairpersons) of baccalaureate nursing programs in Kansas. Baccalaureate programs prepare nursing students to obtain registered nurse (RN) licensure. Exclusion criteria included nursing program deans,

directors, or chairpersons who exclusively lead graduate-level nursing programs, associate degree nursing programs, or licensed practical nurse programs.

Nursing program deans, directors, and chairpersons of baccalaureate nursing education programs in Kansas were chosen for the study sample for several reasons. First, baccalaureate nursing education is a priority. The IOM called for 80% of the nursing workforce to be baccalaureate-prepared by 2020 to meet the demands of an increasingly complex healthcare system (IOM, 2010). Second, in Kansas, 15 baccalaureate nursing programs graduated 45% of the nursing students from the 40 baccalaureate and associate degree nursing programs leading to RN licensure (Kansas State Board of Nursing, 2015). Third, leaders of nursing education programs are responsible for providing the support and resources necessary to prepare nursing students for professional nursing practice, including the area of nursing informatics (NLN, 2015).

Study participants were recruited from members of the Kansas Association of Colleges of Nursing (KACN). KACN is one of four education councils in the state of Kansas working collectively to promote quality nursing education at all levels of nursing education (Kansas State Board of Nursing, 2016). KACN is comprised of approximately 18 leaders, including deans, directors, and chairpersons, representing 17 baccalaureate nursing education programs in the state of Kansas. The purposes of KACN are “to promote baccalaureate and higher degree nursing education by maintaining a network for nurse educators in higher education programs to facilitate communication, collaboration, legislative action participation, and advocacy for quality nursing education in Kansas” (Kansas State Board of Nursing, 2016, p. 3).

Access to potential study participants was gained by contacting the chairperson of the KACN organization, in writing, and requesting approval to invite members of the organization to

participate in the study (see Appendix G). The study setting was the attendance site for KACN's quarterly meeting in Wichita, Kansas, held April 26, 2017, with follow-up telephone focus groups. While attendance at the KACN meetings averages approximately 17 members (L. Adams-Wendling, personal communication, November 11, 2016), a variety of factors led to a small turnout for the April meeting. The telephone focus groups, as suggested by the chair, were considered an extension of this meeting.

### **Data Collection**

**Time frame and recruitment.** The study began after approval was obtained from the Human Subjects Committee at KUMC. The student researcher obtained permission from the KACN chairperson to make an announcement about the proposed study during the February 2017 phone conference meeting. The study purpose, planned data collection methods, and opportunity to participate was presented (Appendix H).

The study sample was recruited and study data collected using two approaches. First, approximately two weeks prior to the April KACN meeting, a study packet containing an invitation to participate letter (Appendix I), informed consent (Appendix J), survey consent (Appendix K), a fillable PDF survey (Appendix L), ANA (2008) definition of nursing informatics, and QSEN (2007) informatics competencies (Appendix D), were emailed to all KACN members by the KACN chairperson. Second, at the April KACN meeting, the student researcher invited KACN members to participate in one of three focus groups scheduled as part of the KACN meeting (one on-site, two via telephone within ten days of the meeting).

**Sample size.** Sample size in qualitative studies depends on the research method selected. For focus groups, 4 to 12 participants per focus group are recommended (Marshall & Rossman, 2016). While the researcher considered this recommendation with the expectation of two groups

with four to six participants, meeting attendance allowed for one face-to-face group of four participants and two telephone groups consisting of three participants and two participants, respectively. The use of co-leaders allowed opportunity to maintain dialogue in the smaller groups.

Nine completed written survey responses were received from participants. Summary demographics are reported in Chapter 4.

**Data collection methods.** Data collection for surveys included a written survey in fillable PDF format (Appendix L) and focus groups with semi-structured interviews (Appendix M). All data collection was conducted by the student researcher and faculty co-investigator. The survey questions were generated from the study research questions and peer reviewed by committee members. This included a qualified expert in nursing informatics and an expert in qualitative research.

Participants were asked to complete the written survey prior to the April KACN meeting. The written survey, consisting of eight demographic items and four survey questions, was distributed via email two weeks prior to the KACN spring meeting along with the waiver of consent form. Since the informatics topic may have been considered new to some, copies of the ANA (2008) definition of NI, and QSEN (Cronenwett et al., 2007) NI competencies (Appendix D) were shared as a resource for those interested. Participants were asked to bring a printed copy of the completed survey to the April meeting. A clean copy was provided at the meeting if this was forgotten. The surveys were collected following each focus group with completion of the survey indicating implied consent.

A focus group method assumes that participants' beliefs and attitudes are socially constructed (Marshall & Rossman, 2016). Listening to others' perspectives and experiences can

influence individuals in forming their own opinions. In a focus group interview, the researcher asks open-ended questions about the phenomenon of interest to achieve the aims of the research study. The researcher moderates the focus group interview by guiding the discussion and facilitating participation by all participants. Group interaction in focus groups elicits information-rich data (Jamieson & Williams, 2003). This method supported the purpose of the research study by allowing study participants to convey their knowledge and perspectives about the phenomenon of interest, nursing informatics, in the context of social interaction.

Participants in focus groups should be homogenous in a shared characteristic or experience on which the focus group interview has been developed. However, some participant heterogeneity is desirable to stimulate group discussion (Jamieson & Williams, 2003). In this study, participants all shared the leadership characteristic, but had diversity of age and leadership experience. Through interaction and discussion by participants in the focus group, the researcher experienced the reality of the phenomenon of interest through the rich descriptions of participants (Marshall & Rossman, 2016).

To prepare for this study's focus groups, videos were reviewed and a pilot focus group with two faculty colleagues was held to practice the process. Lessons learned from this group included the need to be organized with study documents and recording devices to maintain best use of participants' time. Sample issues raised by participants from the pilot group included lack of clarity on what was meant by NI, the benefit of providing the QSEN document, and the need to remind participants that the QSEN NI competencies were provided in their study materials packet.



As noted, study participants were invited to participate in one of three focus group sessions scheduled as part of the KACN meeting. Informed consent, in writing, was obtained with study participants prior to the beginning of the focus group sessions (Appendix J).

The focus group interviews were conducted by the student researcher and co-investigator. The focus group sessions took place at the KACN meeting attendance site or within ten days following the meeting via telephone. Study leaders were in separate private offices. Participants were asked to be in a private area to maintain confidentiality. The student researcher used a semi-structured interview approach with four prepared interview prompts developed from the literature and professional expertise (Appendix M). These were peer-reviewed by committee members, including a qualified expert in NI and an expert in qualitative research.

In addition to the prepared interview prompts, additional probing questions were asked based on participants' responses to the primary interview prompts. Probing questions are used to elicit deeper responses to an interview prompt, for example, to provide additional detail, elaboration, or clarification of a participant's response (Patton, 2015).

Interviews were recorded using an audio recorder. A second audio recorder was used as a back-up. The researcher took field notes during the focus group interview. Field notes included detailed descriptions of what was observed at each group and subjective elements, such as the researcher's self-reflections (Marshall & Rossman, 2016). Of interest, the telephone focus groups proceeded in a very similar manner as the face-to-face group. The only noted difference was the need for the leader to make "listening" type comments to participants, since the visual element was missing.

Member checking was conducted with participants during the focus group interview. Member checking occurs when the researcher summarizes the data for accuracy and clarification (Marshall & Rossman, 2016).

### **Ethical Considerations**

Approval from the Human Subjects Committee at KUMC was obtained prior to conducting the study. Prior to the start of data collection, the researcher completed the KUMC Human Subjects Protection, Health Information Portability and Protection Act (HIPAA), and University Privacy and Security Awareness tutorial requirements.

Approximately two weeks prior to the April 2017, KACN meeting, a study packet containing an invitation to participate letter (Appendix I), focus group informed consent (Appendix J), waiver of consent document (Appendix K), ANA (2008) definition of nursing informatics, and QSEN (Cronenwett et al., 2007) informatics competencies (Appendix D) , was emailed to all KACN members by the KACN chairperson. Completing the survey implied consent. Those choosing to participate submitted, in addition, an anonymous paper copy of the survey at the April KACN meeting or via confidential mail.

For the focus group session, individuals interested completed an informed consent form (Appendix J) prior to the beginning of the focus group session. Participants completing the written survey and focus group session were informed that participation was voluntary and that they could withdraw from the study at any time. Participants were informed that all responses provided in the survey and the focus group interview were confidential. Transcriptions of focus group data used assigned letters for participants so no participants' names were recorded. Results of the study were reported using group data and any examples used de-identified responses.

Hard copies of all study data are housed in a locked file cabinet accessible only to the researcher. All study data will be maintained and destroyed per KUMC research study protocol.

### **Data Analysis**

**Content analysis.** Data analysis of the focus group data, using inductive content analysis, was conducted by hand by the researcher. The purpose of inductive content analysis was to produce a succinct, but broad description of the phenomenon of interest by creating categories that describe the phenomenon. Prior to conducting the data analysis, a preparatory step was completed. This step was choosing the type of content to analyze (manifest, latent, or both; Elo & Kyngäs, 2008).

Descriptive data analysis included manifest content. Manifest content included participant verbal responses during the focus groups. In this study, manifest content was analyzed using inductive content analysis. Data immersion occurred by listening to the recorded data several times, accurately transcribing the data, and reading the data transcript multiple times for depth and clarity of understanding. In addition, written survey data was reviewed for comparison, as later reported.

Inductive content analysis was used to analyze the data in this study. Inductive content analysis is used to describe a phenomenon, particularly when there is limited knowledge about the phenomenon (Hsieh and Shannon, 2005). There are several steps in conducting inductive content analysis: (a) identification of meaning units, (b) coding, and (c) creating sub-categories and categories. This process is called abstraction. Abstraction means creating fewer, but increasingly broad, higher-level headings of meaning from the data (Elo & Kyngäs, 2008).

For this study, the data was first read several times to achieve immersion and get a sense of the overall content. Second, text that captured key content related to the phenomenon of interest was highlighted. Third, text containing key thoughts or concepts was restated (referred to as a “restatement” or “condensed meaning unit”). Fourth, each condensed meaning unit was assigned a code. Codes label the meaning units with terms that succinctly describe the meaning unit’s content. A coding sheet was used to group highlighted text, identify the condensed meaning units and codes, and record notes (see Appendix N). Fifth, codes were clustered into categories based on related content. The subcategories were further abstracted into fewer, but broader, categories until the final categories were identified. Categories describe the manifest content of the textual data and are the end-product of inductive content analysis in descriptive studies (Graneheim & Lundman, 2004; Hsieh & Shannon, 2005). Thoughts and insights were recorded throughout this process.

The focus group data was compared to the written survey data for consistency (a method of data triangulation) and to add to the thickness and richness of description of the phenomenon of interest (Carter, Bryant-Lukosius, DeCenso, Blythe, & Neville, 2014). Responses to the four written survey questions were summarized in descriptive bulleted format (see Appendix O). These responses were reviewed to confirm no new categories or subcategories emerged. This data is further addressed in Chapter 4.

### **Trustworthiness**

Trustworthiness (methodological rigor) was guided by Lincoln and Guba’s (1985) framework for trustworthiness: (a) credibility, (b) dependability, (c) confirmability, and (d) transferability. Credibility, demonstrating the soundness of the study, was maintained by purposeful sampling, researcher reflexivity, data triangulation, member-checking, and peer

debriefing. Researcher reflexivity was evidenced with a reflexive journal which documented the researcher's actions, feelings, biases, and insights during the study.

As noted, data triangulation included the use of multiple sources of data including written surveys and focus group interviews. Debriefing was conducted with a KUMC academic faculty skilled in qualitative research. Dependability was demonstrated by an audit trail which included the decisions made during the planning, implementation, analysis, and evaluation of the study processes. Confirmability was shown by demonstrating a clear association between the researcher's assertions, the study data, and the research methodology used. Transferability was evidenced by rich descriptions of the findings. Rich descriptions of study findings can assist readers of the research study to evaluate whether study findings are meaningful to other individuals in similar circumstances (Patton, 2015).

### **Researcher Background**

The researcher is the primary instrument in qualitative research. The credibility of the researcher contributes to the rigor of a study (Patton, 2015). The student researcher for this research study completed two courses in qualitative research at KUMC. In addition, the student researcher completed 15 credit hours of didactic coursework and one credit hour of practicum in informatics during doctoral coursework at KUMC. The student researcher also has three years of experience as nursing faculty in a baccalaureate nursing program.

The student researcher conducted a self-study about the focus group method by reading literature and engaging in multimedia presentations about focus groups. Guidance in the use of the focus group method was sought from the student researcher's dissertation chairperson and other KUMC nursing faculty experienced in qualitative research.

**Summary**

Chapter Three discussed the research study purpose, research questions, design, sample, setting, data collection, researcher background, data analysis, trustworthiness, and ethical considerations. The written survey and focus group method were discussed as data collection methods. Inductive content analysis was discussed as the qualitative data analysis method used. Conducting a written survey in addition to the focus group sessions aided in method and data triangulation, strengthening the validity of the study data. Data from the written survey and focus group discussions increased the researcher's understanding of how nursing informatics impacts the baccalaureate nursing curriculum, including associated strategies and challenges with incorporating nursing informatics into the curriculum.

## **Chapter Four: Results**

This chapter provides a summary of the demographic characteristics of the study participants, results of the focus group to address the research questions, and results of the participant survey. Findings in this analysis identified two overarching categories, challenges with curricular integration and success strategies for integrating nursing informatics (NI) in the curriculum. Each overarching category, subcategories, and supporting statements, is discussed. The category, challenges with curricular integration, addresses Research Question 2. The category, success strategies for integrating nursing informatics (NI) in the curriculum, addresses Research Question 3. Responses from Research Question 1, relating to the understanding and description of NI and its importance in the curriculum, are evidenced throughout the two major categories.

### **Demographic Results**

The sample included nine baccalaureate nursing program leaders in the state of Kansas, representing 53% of Kansas baccalaureate nursing programs. Study participants completed the written demographic survey prior to the focus groups. The majority of the participants were doctorally-prepared ( $n = 8$ ) and over 60 years of age ( $n = 5$ ). Three participants were deans or associate deans; three noted themselves to be directors or chairpersons. Three identified themselves as having other faculty leadership positions. Participants worked in a BSN program from 1.5 years to 29 years, with an average of 10.56 years. One participant did not answer this question. Participants worked in their current leadership positions between one year and 14 years, with an average of 5.5 years. One participant did not answer this question. Most participants work in a public institution ( $n = 5$ ). Most of the institutions ( $n = 4$ ) where participants were employed had a student enrollment between 3,000 and 9,999 students and were

located in an urban area of 50,000 or greater people ( $n = 5$ ). For a summary of demographic results, see Appendix P.

### **Category One: Challenges with Curricular Integration**

Challenges with curriculum integration are considered as any source that makes it difficult or not feasible to incorporate NI content into the curriculum. This might include, for example, limited funding for, or availability of, faculty development opportunities.

This category was characterized by four subcategories that summarize the noted challenges: (a) agreeing on a definition, (b) gaining tools and resources for curricular integration, (c) developing faculty, and (d) encountering legal and ethical issues (see Appendix Q).

**Agreeing on a definition.** Participants agreed that defining NI was difficult because, as they noted, the definition changes over time and continues to evolve as technology advances. Getting all faculty to agree on a common definition of NI was considered imperative for successful curricular integration. Participants indicated faculty needs to agree on a definition so they can support students in understanding and applying informatics concepts. Uncertainty about the definition of NI was evident. One participant stated:

The most difficult thing for us is we're to integrate informatics into the program. I mean, identifying what the definition of informatics really is. I think, from our perspective, we look at it from the standpoint of data-gathering or being able to access patient data, but also, we always jump to the electronic medical record.

Another participant indicated that in the early years of NI, "if it was technology-related, it counted." Computers were initially viewed as synonymous with NI, but participants recognized technology as only a part of NI. One participant summarized that information systems, the computers that store and process patient information (i.e. the EHR), are an inherent part of



contemporary healthcare settings. Managing data using computer technology is the focal point of current NI definitions. Participants also stated that information literacy was a component of NI:

We sometimes interchange ‘information literacy’ with “nursing informatics,” but we recognize that they are different in that students need to be able to gather information, know that it’s appropriate, and they know how to use the information. So that’s part of what we think of as nursing informatics.

One participant identified clinical lab simulators as part of NI “because they hold so much information themselves as we’re teaching.” Another participant included educational assessment software as a part of NI by stating, “I guess it’s another informatics program because we can get data from it.” Of interest, current definitions of NI focus on patient-related data. In summary, participants recognized that technology, information management, and information literacy were interrelated parts of NI but did not independently define NI. They additionally were extending the description beyond patient-focused approaches.

**Gaining tools and resources for curricular integration.** This section addresses two issues, lacking resources and experiencing the EHR. Participants indicated several resources as challenges to integrating NI in the curriculum. Participants noted that one resource utilized by a majority of participants’ programs, the EHR, posed challenges in the educational and clinical settings.

**Lacking resources.** Participants noted lacking resources could be a significant challenge to curricular integration. Participants identified challenges related to finances, time, faculty development, and NI experts.

**Finances.** Finances were mentioned most often by participants as a deterrent to curricular integration. One participant noted NI resources often had low priority compared to

other curricular content. Another participant indicated the most prohibitive cost was purchasing or creating an academic EHR. One participant stated their program had purchased an academic EHR in the past that was not user-friendly, so it did not get used. Another academic EHR was not purchased because of cost. When indicating her school was creating an academic version of a clinical information system for students, another participant stated, “we are already over a million dollars in, and it’s not done yet.” Participants also noted some students needed portable technology available to chart in the academic EHR when they did not have access to the clinical EHR, but the expense was too prohibitive for students and the program budget.

*Time.* Participants identified two time challenges. First, participants noted a considerable amount of time was necessary to integrate NI content into the curriculum. They felt competing demands of other curricular content restricted the amount and depth of NI content that could be included.

Second, faculty and students needed to be trained on the clinical EHR if students had access to documenting in the EHR during clinical experiences. Representatives from the clinical sites usually trained faculty on use of the EHRs. Faculty often trained the students. Training for both faculty and students was time-intensive, particularly due to the multiple clinical sites in which students were assigned. Lack of faculty trained in the various clinical EHR systems inhibited the students’ clinical experience, for example, if a trained faculty member was absent from the clinical experience and an untrained faculty member substituted. Expecting faculty to train at all clinical sites was viewed as unrealistic.

*Faculty development.* Participants reported faculty development as another challenge. Two specific issues included transitioning between generations and the availability of faculty development opportunities for learning and updating NI skills.

Some noted that getting faculty to buy in to NI was difficult. Participants noted older faculty, in particular, often lacked interest in learning NI skills. One participant stated, “we’re seeing the transition in the ‘old guard’ faculty,” implying that older faculty, less skilled in NI, were close to retiring. Curricular integration was considered unfeasible without faculty who were willing to learn and implement NI content.

Participants stated faculty needed to develop a new NI skill set for contemporary educational and clinical practice settings. As one participant indicated:

We need the next generation of faculty who think about using informatics every day in what they do, and that it becomes a second nature to them. We have to have a new generation of faculty who have a very different skills set who we are asking to do something we’ve never asked them to do before.

One participant identified faculty needed skills such as competency in quality improvement, data management, and statistics. Another participant stated that clinical faculty needed to be skilled in the same basic skills students are required to perform with the simulators and academic EHRs. The faculty’s learning curve was identified as the greatest challenge to the adoption of information technology. Participants also noted that in addition, faculty needed to identify more teaching strategies to present NI content. Participants noted that faculty were interested in attending staff development opportunities, but demonstrated limited follow-through. Lack of programming, lack of awareness of available programs, and insufficient communication about faculty development opportunities were indicated as reasons for non-attendance. As one participant noted, “It doesn’t hit the radar of most faculty...I think we’ve missed a generation of nursing faculty and so, we’re trying to play catch-up.”

*NI experts.* Teaching NI content was noted as challenging without the availability of NI experts. For example, NI experts were needed to help students with quality improvement projects and update EHR simulations, but noted that availability of an NI expert in nursing programs was uncommon. Even when an NI expert was available, communication was often difficult between faculty and the NI expert. One participant stated:

What's always seemed a barrier to me is that your informatics technology people may not tend to be nurses, and so, it's hard. We don't speak the same language and may not know the right question to ask to get the data we want.

**Experiencing the EHR.** Specifics for selecting and the using an academic EHR, such as what brand, and when and how to implement the new resource, were described as challenges for faculty. Participants noted academic EHRs were mostly utilized in simulation experiences. However, one participant indicated students documented in an academic EHR at the clinical site using a portable technology device because students were unable to access the clinical site's EHR.

If students were using an academic EHR in the educational setting, it might or might not be the same brand of EHR experienced in a clinical setting. Students interacted with different EHRs at multiple clinical sites with different levels of access, making it challenging to learn consistent documentation skills.

Also, functions of the academic EHR were noted as limited. Documenting was noted as usually the only capability within the academic EHR. Participants noted the academic EHR should have similar functions as a "real" EHR. With limited functions, they felt that opportunities for critical thinking were diminished. One participant noted, "you have to get past just putting in numbers. You want to move to, "what does that [data] actually mean?" Some

students' attitudes about charting were negative. Students were initially excited about documenting, then interest waned as they learned this would be an ongoing process.

**Encountering legal and ethical issues.** Faculty felt there were many legal and ethical issues to discuss. This subcategory addresses four legal and ethical issues: (a) confidentiality issues, (b) social media challenges, (c) documentation challenges, and (d) clinical workaround challenges.

**Confidentiality issues.** Participants reported that maintaining patient confidentiality was important for students documenting in the EHR, however, teaching patient confidentiality was a challenge. They felt the younger generation lacked understanding about confidentiality and the implications of violating confidentiality. They noted that even practicing nurses who were students struggled with confidentiality issues. As one participant stated:

We are teaching a generation who doesn't really know what privacy is, because their life is on Facebook...they truly do not comprehend what you are talking about. Because it's not a concept they've ever lived with...[there is] nothing they don't share.

Other confidentiality issues mentioned were printing off patient information, removing patient information (not de-identified) from a clinical site, and sharing patient information via technology.

**Social media challenges.** Social media was described as a significant influence on students. Putting confidential information on social media was noted as an increasing problem. Participants reported that, as with other confidentiality situations, students did not view sharing this information on social media as wrong or consider the possible implications. Also, maintaining professional boundaries between faculty and students or patients and students was

noted as a problem. One participant indicated that she did not “friend” any students or patients on Facebook to maintain professionalism.

***Documentation challenges.*** Documenting was described as an important part of patient care. Participants reported that students sometimes viewed documentation as separate from patient care or a task taking away from patient care. One participant commented:

I’ve heard, across the spectrum, we spend so much time documenting that we don’t have time to care for our patients. And I think that one thing that is important to stress to our students and to new nurses is that documentation is part of your care for your patient.

Participants noted the need to teach students that if documentation was not accurate, patient care might be affected. They reported that students mindlessly clicked required documentation items because they were perceived as laboriously detailed. Faculty faced challenges helping students to understand that documentation was considered a legal record and a component of legal requirements of managing information. In addition, documentation was often limited by pre-set options and did not present a logical flow of information. On a separate note, participants agreed that some documentation features in some systems did not add value in the EHR.

***Clinical workaround challenges.*** Participants reported seeing nurses create workarounds when encountering barriers to documentation in the EHR and were concerned that this might influence students’ practices. For example, when documenting a patient health assessment, nurses might enter information in a way to avoid additional charting. One participant stated, “I’ve actually had nurses tell me that the computer documentation now has gotten so detailed...and if you put that it [body part] is abnormal, then you end up with 26 other questions to answer.” Another participant described:

I know when the system won't support the nurse, that they will create workarounds by printing off the bar codes [for medication administration], and stick them on a piece of paper. Then they just scan the paper instead of the patient. Because when they try to scan the patient, then something happens to where they can't progress.

In summary, Category 1 described four major issues which challenged integration of NI into the curriculum: (a) agreeing on a definition, (b) gaining tools and resources for curricular integration, (c) developing faculty, and (d) encountering legal and ethical issues. The subcategory, lacking resources, included four resources that participants indicated were challenging to procure: (a) time, (b) finances, (c) faculty development, and (d) NI experts. In the subcategory, experiencing the EHR, participants noted the difficulty selecting a specific academic EHR and when and how to integrate it into the curriculum. In addition, participants noted the functional limitations of the academic EHR. Participants also noted the challenges of learning documentation skills because of multiple brands of EHRs encountered in various clinical sites. Encountering legal and ethical issues was also reported as challenging and issues with confidentiality, social media, documenting, and using workarounds were noted.

### **Category Two: Success Strategies for Integrating NI in the Curriculum**

While participants named numerous challenges to integrating NI into the curriculum, they also identified success strategies. This category was described as actions that were effective in incorporating one or more aspects of NI into the curriculum. This category was characterized by two subcategories, determining NI needs for the curriculum and leadership roles and responsibilities.

**Determining NI needs for the curriculum.** This subcategory consisted of multiple factors that included identifying program foci (generic BSN program versus RN-to-BSN focus), following curricular guidelines, and considering learner characteristics.

**Identifying program foci.** Participants noted the foci for integrating NI into the generic BSN program included introducing the basic skills of documenting and retrieving data and the students' role in documentation. Generic BSN students were noted to be learning basic nursing knowledge and skills, such as patient assessment and care interventions. The students' ability to document accurately and look up patient information was considered important. One participant stated, "at the BSN level, it's to introduce students to informatics...to introduce to them why it's important, what their role is as far as putting accurate information in and getting good data out."

For the RN-to-BSN curriculum, more advanced NI skills were included. They noted the foci of the RN-to-BSN curriculum was to value the data (i.e. considering how data can improve patient care), communicate information effectively (i.e. patient education), and use information technology to support their professional leadership roles (i.e. retrieving, analyzing, organizing, and presenting data for a quality improvement project). Because students in the RN-to-BSN program were already practicing nurses, assumptions existed that they were skilled in the basic skills such as documentation and information retrieval. As one participant noted:

Because our nurses are licensed, to drill down to the clinical level of data entry would not have been prudent for us, because there are so many different systems. I don't see it as our role. So we focus more how they can take this information and present it in a way they can communicate evidence...to either educate patients or help make decisions.

**Following curricular guidelines.** Two curricular guidelines were mentioned as directing integration of NI content. These included QSEN (Cronenwett et al., 2007) and AACN's *The*



*Essentials of Baccalaureate Education for Professional Nursing Practice* (AACN, 2008).

Participants affirmed that both entities included content specific to integrating NI content in the nursing curriculum.

***Considering learner characteristics.*** Participants also noted that the characteristics of learners were important. In general, millennials were considered more comfortable with technology and more competent with NI skills than faculty. However, participants noted wide differences in skill sets existed between learners. For example, the younger generation of students was more likely to be familiar and competent with NI. However, beginning students found using information difficult because they were still learning basic nursing knowledge and skills. Participants noted that because of their nursing experience, RN-to-BSN students had different expectations related to NI. They were experienced with organizational change and valued the change process. They also understood the complexity of change and the resources and organizational commitment necessary to implement desired change.

***Leadership roles and responsibilities.*** Within this subcategory, emerging leadership roles and responsibilities included placing NI content in courses: (a) ensuring visibility in the program, (b) providing resources, and (c) creating relevancy.

***Placing NI content in courses.*** Participants noted placing NI content in the curriculum included multiple aspects. The primary leadership responsibility, reported by multiple participants, was ensuring curricular integration of NI content, for example, “seeing that its [informatics] is threaded from the top down,” and “essential concepts are inside the courses.” This included both didactic courses and practical application of NI skills with quality, realistic simulated experiences and clinical experiences.

Participants indicated that for effective integration, NI content should be integrated early and gradually in a program. For example, several participants stated they were introducing the academic EHRs during the first semester of the nursing program with simulation experiences so students could become familiar with documentation before their clinical experiences. Faculty then had an opportunity to perform a pre-clinical documentation skills assessment so students could visualize where they were at with their documentation skills before charting in the clinical EHR. One participant reported having an academic EHR used in conjunction with a simulation scenario in which students could document in “real time” as the simulation progressed. One participant stated, “it is my duty to provide something that is as real as possible and to give them the best opportunities to learn what it is really going to be like when they’re there [clinical environment].”

Participants reported NI was integrated into the curriculum three different ways. This included NI content threaded across the curriculum, NI taught as a dedicated course, or a combination of both options. No options were designated as better than another. Sample strategies identified to integrate NI content included: (a) incorporating online assignments to promote basic information literacy, (b) reinforcing information literacy taught in the NI course in an evidence-based practice course, (c) presenting the RN’s role in keeping a population healthy (by working with larger data sets incorporated into both a dedicated NI course and population health course), and (d) having current textbooks with supplemental NI resources.

***Ensuring visibility in the program.*** Participants noted that program leaders needed to ensure that the NI content was visible throughout the curriculum, including the program’s philosophy and outcomes. At a more basic level, the leader also needed to ensure that NI content was evident in the appropriate didactic courses and practical application of skills.

***Providing resources.*** The program leader was also noted to be responsible for providing educational resources related to NI to faculty and creating a “comfort zone” for learning NI knowledge and skills. As noted by several participants, part of this comfort zone included identifying a faculty champion. One participant stated, “I think having faculty champions is absolutely key, and you have to have people with the interest and skills to do it. That’s been really helpful for us.” In addition to being a skilled resource, a faculty champion helped motivate faculty and change the educational culture to be more conducive to curricular integration of NI. One participant indicated that the first implementation of an academic EHR was not successful because she didn’t have a faculty champion.

Participants reported faculty development opportunities in NI through various professional nursing organizations via conferences or online resources, vendor-specific training on academic EHRs, simulation experiences at other sites, and college NI courses as the most prevalent. While noting that faculty preferred briefer NI educational opportunities, participants indicated workshops were often too limited in content to be helpful. One example of a faculty development opportunity was earning continuing education credits for online QSEN competencies education which included NI. Peer mentoring by a more experienced and skilled colleague was also suggested.

***Creating relevancy.*** One participant indicated, and was supported by other faculty, creating relevancy for NI content with students was another key aspect of curricular integration. The participant noted that stimulating interest in, as well as conveying the value of NI, was difficult because of the competing demand of learning basic nursing knowledge. One participant indicated, “they [students] don’t know what to do with information because they are still learning

skills, knowledge, and other roles.” Some participants noted students viewed NI content as a mere checkbox to complete so they could move forward.

Participants suggested that finding meaningful ways to use data helped students see its relevancy. They noted, for example, engaging students in quality improvement projects to demonstrate NI’s value. An example included clarifying the purpose of collecting and using data to make evidence-based decisions for improving patient health outcomes. One participant commented on positive experiences with this approach, stating, “I don’t think our graduates today think that quality improvement is their manager’s job. I think they get that it’s their job.”

In summary of Category 2, participants identified two subcategories that aided integrating NI into the curriculum, determining NI needs for the curriculum and leadership roles and responsibilities. In the subcategory, determining NI needs for the curriculum, success strategies noted by participants were identifying program foci (generic versus RN-to-BSN), using published curricular guidelines for integration, and considering learner characteristics. For the subcategory, leadership roles and responsibilities, effectively placing NI content in didactic and clinical courses, ensuring visibility of NI in the program, providing resources for NI integration, and creating relevancy between NI and professional nursing practice were also identified as success strategies.

### **Summary of Survey Data**

Participants were asked to complete a 4-question written survey (see Appendix L). A total of nine participant returned the survey. The following responses are synthesized from participants’ written responses.

When asked what the term “nursing informatics” meant in their curriculum, participants indicated that NI in the curriculum included the use of technology to document, maintain, and

access information. Information was used to make decision in patient care that improved the quality of patient care. They considered information literacy skills a part of NI.

When asked what strategies are used to integrate NI into the curriculum, participants reported that strategies include elements of nursing informatics infused across the curriculum. However, they indicated informatics content was at times limited. Online learning assignments, use of databases, oral and written papers, presentations, and documentation in the electronic health record in clinical settings were examples of strategies used.

Participants responded to the question about identifying the challenges of integrating nursing informatics into the curriculum as including student and faculty factors. Lack of knowledge related to informatics among faculty, availability of faculty development opportunities, and time demands on faculty were considered challenges to integration. They indicated that students may not value the importance of NI in the curriculum, making integration more difficult.

Finally, participants were asked to rate their most knowledgeable and skilled faculty member in NI based on Benner's (1982) novice-to-expert model (novice, advanced beginner, competent, proficient, and expert). Of the seven participants who responded to this item, two described their faculty as "novice," two as "competent, one as "proficient," and one as "expert." One participant responded that competency was age-related, with those under "40-ish" as "competent" or "proficient," and those 40 years of age and over as "advanced beginners."

Participant responses to four written survey questions were synthesized and reported (see Appendix N). These responses support the information in the categories of focus group data.

## **Summary**

In summary of Chapter Four, participants' responses were summarized in two overarching categories, challenges with curricular integration and success strategies for integrating NI in the curriculum, with multiple subcategories. While challenges were most evident, there were also beginning success strategies noted. The majority of success strategies were observations that need further examination. The perceptions of, experiences with, and importance of NI as addressed in Research Question 1, was well-reflected throughout both categories. The written survey data supported the focus group data. The identified challenges and success strategies to curricular integration offer opportunities for discussion among BSN program leaders and nursing faculty. Chapter 5 will provide further discussion and implications of the study findings.

## **Chapter Five: Discussion**

The purpose of this qualitative descriptive study was to examine baccalaureate nursing program leaders' perceptions and experiences related to nursing informatics in the nursing education setting. This chapter provides a discussion, implications, limitations, and recommendations for future research. Through qualitative data analysis, insight was gained into the baccalaureate nursing program leaders' perceptions and experiences related to nursing informatics. The study was guided by the following research questions:

1. What are BSN program leaders' understanding and description of nursing informatics and its importance in the nursing education curriculum?
2. What do BSN program leaders perceive as challenges to integrating nursing informatics in the nursing education curriculum?
3. What strategies and successes do BSN programs leaders describe related to integrating nursing informatics into the nursing education curriculum?

### **Discussion**

Nursing informatics is a complex concept for those working in nursing education programs to understand, communicate, and integrate into the curriculum. Nursing program leaders are challenged to facilitate this process.

The research questions in this study were addressed by two overarching categories identified through inductive content analysis and supported by written survey data. Through data analysis, an understanding of the nursing program leaders' perspectives of and experiences with nursing informatics was obtained. The understanding and importance of NI, the first research question, was integrated into the two identified categories addressing the challenges of, and successes with, integrating NI into the baccalaureate nursing curriculum. The following

discussion will address the two overarching categories identified, challenges with curricular integration and success strategies for integrating NI into the curriculum.

### **Category One: Challenges with Curricular Integration**

This category identifies select challenges with incorporating NI content into the nursing curriculum. Challenges with curriculum integration are considered as any source that makes it difficult or unfeasible to incorporate NI content into the curriculum. The four subcategories of challenges include agreeing on a definition, gaining tools and resources for curricular integration, developing faculty, and encountering legal and ethical issues. These challenges provide a framework to begin brainstorming how to address barriers to curricular integration of NI content.

#### **Agreeing on a Definition**

Participants discussed the need for agreement on a definition of NI to effectively guide curriculum integration. However, participants also noted having difficulty selecting a definition because multiple definitions exist, and definitions change. Participants indicated that uncertainty about the meaning and content of NI exists. This uncertainty is consistent with the literature about faculty challenges with informatics (Dixon & Newlon, 2010; Foster, 2016; Larson, 2015; McNeil et al., 2006). Group participants identified technology, information literacy, and managing information as components of NI, consistent with the literature (Hebda & Calderone, 2010). However, when identifying specific examples of NI, participants were less certain. The EHR was identified as the most prominent representation of NI. As one participant noted, “we always jump to the electronic medical record” when asked what NI means in the curriculum. Participants, sometimes without noting the use of academic EHRs, included clinical simulation as a part of NI “because they hold so much information themselves as we’re teaching.” One participant identified an exam assessment software program as an example of NI because “we



can get data from it.” Similar to the pilot study, one participant initially equated informatics with how computers were used to educate and evaluate students (i.e. online educational resources and testing).

Some confusion seems to exist about helping students learn to use data versus the benefits of student data for faculty. Nursing informatics is considered a part of clinical informatics which is “the application of informatics and information technology to deliver healthcare services” (AMIA, 2016c). If viewed in this context, the EHR is considered part of NI, which clinical simulation without an academic EHR or using educational software, is not. Ambiguity and confusion about what constitutes nursing informatics remains. It will be important in future program discussions to consider that the broad descriptors of NI for health professionals is directed towards improving patient care. While data about students is valuable from an educator’s perspective, this is different than a patient care situation.

### **Gaining Tools and Resources for Curricular Integration**

Gaining tools and resources was also identified by participants as a challenge. Participants noted finances, time, faculty development opportunities, and availability of NI experts as resources which were limited to promote curricular integration of NI. Some participants identified the purchase and associated costs of an academic EHR could be prohibitive. In addition, the opportunities and time required to train on clinical EHRs at multiple sites was also identified as a challenge. These challenges are consistent with a study reported by Herbert and Connors (2016). Further research on how best to assist programs with these challenges is indicated.

## **Developing Faculty**

One participant expressed faculty's learning curve as the greatest challenge to the integration of NI. Results of the written survey for this study showed that, out of seven responses, four program leaders perceived that their faculty member "most knowledgeable and skilled in NI" as having only a basic competency level or below as identified by Benner (1982). Participants, consistent with the literature, indicated that more faculty development in NI and NI teaching strategies are needed including teaching and learning the EHR (Foster, 2016; Herbert and Connors, 2016; Flood et al., 2010; & Nguyen, Zierler, and Nguyen, 2011).

Although participants were able to provide examples of faculty development offerings they had attended, these were limited in number. One participant stated that faculty seemed interested in attending faculty development opportunities, but demonstrated limited follow-through. However, other participants reported older faculty, in particular, had shown a lack of interest in learning new NI knowledge or skills, similar to study findings by Hern, Key, Goss, and Owens (2015). One participant noted that there was also lack of awareness and insufficient communication about faculty development opportunities. Opportunity exists for collaboration between program leaders and faculty to search for and communicate faculty development opportunities.

The EHR is typically the primary source of information technology with which nursing students interact in patient care. Faculty and students experienced EHRs in multiple clinical settings, consistent with other reports. The academic EHR was used in simulated experiences in the educational setting or as a method of documentation in a clinical setting when they did not have access to documenting in the clinical EHR. Participants indicated the time demands for training in clinical EHRs at multiple clinical sites were often not realistic. In

addition, the cost of purchasing an academic EHR was prohibitive for some students or programs. Herbert and Connors (2016) identified lack of access to clinical EHRs, required training time, and funding for academic EHRs as significant barriers. In addition, participants reported that academic EHRs have limited functions, including primarily documentation and data retrieval. Although these are the priority skills generic BSN students learn, this prevents students from having a realistic experience with an EHR that is comparable to the functions of a “real” clinical EHR. Further work in this area is needed.

### **Encountering legal and ethical issues**

Legal and ethical issues were also present. Participants reported confidentiality, documentation, social media, and clinical workarounds as potential issues. Participants noted that students struggled with understanding patient confidentiality, particularly as it relates to social media. One participant indicated that younger students, having technology present throughout their lives, did not realize what confidentiality means “because their life is on Facebook.” Social media was noted as a particular concern related to sharing patient information and blurring professional boundaries between educators and students and patients and students. This is consistent with findings in the literature (Englund, Chappy, Janbunathan, & Gohdes, 2012; Marnocha, Marnocha, & Pilliow, 2015).

Documentation in an EHR also presented challenges. Participants noted that some students felt documentation and patient care were unrelated and detracted from patient care. Participants reported students did not always value the information they were entering into the EHR as pertinent to patient safety. Participants indicated frustrations with documentation or other patient care processes led to the use of workarounds, a bypass action to a workflow hindrance in order to obtain a care goal or obtain it more quickly (Debono et al., 2013). Debono

et al. (2013) stated nurses may perceive workarounds as necessary and acceptable to reach a patient care goal and not realize their possible negative outcomes.

In reviewing the QSEN and AACN guidelines (AACN, 2008; Cronenwett et al., 2007), relevant topics that were limited in the focus group discussions included student roles in using information technology for error prevention and promoting a culture of patient safety. This included, for example, limited discussions about computerized medication administration systems and clinical decision support systems. Encouraging programs to include documented guidelines for informatics as part of their curricular discussions is indicated.

This overarching category addressed the challenges to curricular integration of NI content as perceived by program leaders. These challenges provide an opportunity for talking points among program leaders and nursing faculty as to needed strategies to improve the potential for successful NI integration.

### **Category Two: Success Strategies for Integrating NI into the Curriculum**

Category Two includes actions that have been effective with incorporating NI content into the curriculum. These strategies are divided into two subcategories, defining NI needs and leadership roles and responsibilities. These strategies serve as a springboard for further discussions about interventions for successful integration and as resources for other programs.

#### **Determining NI Needs**

Determining NI needs was divided into three topics: (a) following curricular guidelines, (b) identifying program foci, and (c) characterizing the learners. Two sources of curricular guidelines were mentioned by participants for guiding curricular inclusion of NI content, the QSEN competencies (Cronenwett et al., 2007) and the AACN's *The Essentials of Baccalaureate Education for Professional Nursing Practice* (AACN, 2008). The knowledge, skills, and

attitudes competencies found in the QSEN informatics category directly or indirectly support the other five competencies: (a) patient-centered care, (b) teamwork and collaboration, (c) evidence-based practice (EBP), (d) quality improvement (QI), and (e) safety. The informatics competencies use a collaborative, patient-centered approach for collecting, monitoring, evaluating, and using data for quality improvement processes which improve patient outcomes and promote patient safety. Information gained from quality improvement projects and research contributes to evidence-based practice (Smith, Cronenwett, & Sherwood, 2007; Spencer, 2012). The AACN's Essential IV: Information Management and Application of Patient Care Technology, delineates 12 guidelines which include, but are not limited to patient outcomes, patient safety, and evaluating data to inform care (AACN, 2008). Fully incorporating these guidelines into program curricula would provide a comprehensive foundation for NI in the curriculum. As noted, further program discussions assessing curricula in comparison to these recommended documents is indicated.

Further consideration of program focus and student characteristics is also indicated. Participants indicated that the foci of generic BSN programs are documentation and data retrieval; for RN-to-BSN programs, the foci are valuing data for its role in improving patient care, communicating information effectively, and using information technology to support activities of the professional nurse leadership role. These foci are consistent with NI competencies leveled for the beginning nurse graduate and experienced RN-to-BSN nurse (Staggers, Gassert, & Curran's, 2001; ANA, 2008). Some participants noted inclusion of NI content into population health courses and EBP courses. Participants stated NI integration into these courses supported quality improvement processes, research processes, and the role of the RN in safe patient care at the individual and population level. It may be that programs could gain

NI assignment ideas by comparing and contrasting approaches being used to teach NI across different curricula.

Characteristics of learners also played an important part in determining learners' needs and teaching methods. Generational differences were apparent. Participants noted that, while the millennial generation was usually more comfortable with technology, they often lacked skills such as evaluating, prioritizing, and using information because they were focused on learning basic nursing knowledge. These observations are consistent with views on critical thinking and clinical reasoning skills (Johanson, 2012). In contrast, Larson (2015) reported that nursing faculty perceived students entered the nursing program with more technological skills than faculty. However, the technology students were proficient using was not the same technology used in the healthcare setting. Students lacked competency with health information technology. As directed by good teaching practices, beginning student assessments are indicated to meet student needs.

Success strategies for determining NI needs are summarized as: (a) following curricular guidelines, (b) identifying program foci, and (c) characterizing the learners. These success strategies provide a framework for programmatic inclusion of NI content and also include considering the learning needs of students.

### **Leadership roles and responsibilities**

Leadership roles and responsibilities identified by participants included placing NI content in courses, ensuring visibility of NI in the curriculum, providing resources for curricular integration, and creating relevancy for NI in the curriculum.

The importance of the program leader in curricular integration of NI content was emphasized. Participants indicated they were responsible for ensuring comprehensive

integration of NI in the curriculum, both in didactic and clinical courses. In this study, NI content was integrated across multiple courses, provided by a dedicated NI course, or a combination of both. Participants also indicated they were responsible for providing resources, consistent with NLN recommendations (NLN, 2015). This can include, for example, garnering funding for technology or providing the time, funding, and resources for faculty development opportunities.

Participants emphasized their role and the value of identifying a faculty champion for NI. Faculty champions provide knowledge, assistance, and encourage positive attitudes about NI. One participant, consistent with the NLN (2008b) guidelines, stated the faculty champion was key for curricular integration (NLN, 2008b). Faculty NI champions might best serve by taking on a coaching role. As some participants shared, NI interests sometimes varied by faculty ages with older faculty sometimes perceived as being less interested or unwilling to learn NI knowledge and skills or to project the value of NI to students. Faculty engagement with NI, an integral part of the curriculum, is a reasonable expectation for all faculty. Faculty champions for NI might be encouraged to use their coaching role in involving all faculty with NI.

Creating relevancy is another important responsibility for helping students recognize the value of NI. This was accomplished through curricular integration of NI content. One idea mentioned by participants to create relevancy was having students participate in a quality improvement project using information technology to demonstrate the effect on patient outcomes. This is consistent with a study by Huryk (2010) which stressed creating relevancy by showing practicing nurses the benefits to patient outcomes by using information technology.

This overarching category addressed the success strategies utilized for curricular integration of NI content. These success strategies were identified as determining NI needs and

leadership roles and responsibilities. With collaborative efforts of program leaders and faculty, these success strategies could enhance further curricular integration of NI.

### **Study Limitations**

While the intent of this study was to utilize face-to-face focus groups, due to several external factors, only six KACN members attended their scheduled April 2017 meeting (usual attendance of approximately 17 members); four KACN members were able to participate in the scheduled face-to-face focus groups. This initial challenge provided opportunity to pilot, and have success with, telephone focus groups for other members wishing to participate. While participant numbers in the telephone focus groups were less than the Marshall and Rossman (2016) recommendations, as discussed in Chapter 4, robust discussions were obtained in each session.

A limitation for dissemination of this study was that all participants were baccalaureate nursing program leaders from BSN programs in the state of Kansas only. This limits applicability of findings to BSN programs in similar settings.

There are other limitations which may affect the results of a qualitative research study such as this. For example, study participants may tailor responses to say what they think the researcher anticipates or wants to hear (response bias). Another type of response bias, group think, occurs when participants' responses in a group are altered to reflect majority opinion. Professional power differentials or hierarchal relationships may exist which may affect group interaction and responses (Jamieson & Williams, 2003). The potential limitations noted appear to have limited applicability to this study, but should be considered. In this study, many participants had previous collegial relationships. All participants contributed responses to each interview question in both face-to-face and telephone focus groups. No participants in any of the



three focus groups dominated the conversation to the exclusion of other participants. While participants described some similar perspectives and experiences, and did not often disagree with other participants' comments, there was also a diversity of thoughts and experiences shared.

Last, the researcher may introduce researcher bias into the study. Researcher bias occurs when the researcher imposes personal values, beliefs, and attitudes into interpretation of the data. In this study, the student researcher used a reflective journal to document self-awareness of thoughts, values, beliefs, or attitudes which might introduce bias (Patton, 2015).

### **Implications for Nursing**

The effective integration of NI into the BSN curriculum is a vital component for teaching students the knowledge, skills, and attitudes necessary for using information technology to improve patient outcomes. Nursing informatics is a relatively new concept in nursing and questions continue about its meaning and integration into the curriculum. In this study, participants summarized more challenges than successes. However, both challenges and successes prompt valuable points for discussion. Program leaders offer valuable perspectives on these issues.

A reexamination of NI content in the curriculum is warranted. These aspects include: (a) identifying the definition of NI that guides curricular integration, (b) confirming that NI in the curriculum is focused on patient health information, (c) reviewing available curricular guidelines, (d) assessing the curriculum plan to determine if NI content is strategically placed and evident in didactic and clinical courses, (e) implementing proposed changes, and (f) reevaluating the effectiveness of any changes at regular intervals. This process could aid understanding and alignment of NI in the curriculum. Additionally, nurse educators could build

on their knowledge of using student data in the educational process (i.e. electronic testing and management programs) to build on their knowledge of managing patient data using NI.

The program leader could identify or obtain NI leadership for the program. This could include identifying a faculty champion for NI. Having a faculty champion could aid curricular integration by serving as a resource for other faculty and increasing motivation to integrate NI content in didactic and clinical courses. A related approach could be to seek availability of an NI specialist with advanced training to serve as a consultant. This could be helpful if a funded position in the program was not feasible. Because limited funding is a significant barrier to providing resources, nursing programs could consider partnering to share this resource.

Identifying resources needed to complement the integrated NI content could be addressed. If limited funding was an issue, grant opportunities could be sought and utilized. Two participants in the study indicated they had written grants for informatics educational opportunities and simulation resources. For programs who lack access to academic EHRs, partnerships with clinical agencies could be considered, as suggested by Herbert and Connors (2016).

Participants noted that more faculty development and teaching strategies related to NI were needed. To best utilize faculty development opportunities, program leaders and faculty could perform self-assessments of NI skills prior to seeking faculty development opportunities. This could help identify programs better tailored to faculty needs. Additional attention needs to be focused on education and clinical guidance to clinical faculty who work directly with students, their assigned patients, and their patient data sets. For example, in some educational institutions, clinical educators gain guidance in helping students use “clinical playbooks” where NI competencies are included with nursing and interprofessional clinical experience

assignments. Programs could also partner with one another to fund faculty development opportunities. In addition, interprofessional academic and clinical partnerships could be formed to provide a comprehensive system as part of faculty development, such as discussed by AACN (2016).

The most significant legal and ethical issue participants in the study noted was students' lack of understanding about patient confidentiality and its association with social media. Program leaders could ensure policies are in place that address confidentiality and the use of social media, and that students are aware of these policies. Encouraging faculty to include discussions and exercises related to the legal and ethical implications of confidentiality and social media issues in classroom or clinical lab is indicated.

### **Recommendations for Further Research**

Continuing research in this area is vital in the ongoing attempts to understand NI, its representation in the BSN curriculum, and address the challenges NI presents in the curriculum. Much of the previous research was focused on assessing levels of faculty NI competency (Nguyen, Zierler, & Nguyen; 2011; Smith, Cronenwett, and Sherwood, 2007; NLN, 2008). As older faculty retire and younger individuals move into faculty positions, research to re-assess faculty competency is warranted. Since the previous research on faculty competency levels was conducted, some approximately a decade ago, greater emphasis on NI has occurred. This has included more NI education in graduate and undergraduate nursing programs, including NI specialty tracks. Technological advances, such as mobile technology, have occurred. Further research in this area could re-evaluate faculty needs related to NI and help inform future faculty development needs.

Research to assess nursing students' preparedness to enter nursing practice with NI knowledge and skills is also recommended. Previous research indicates novice nurses are not adequately prepared to use information technology when they enter practice (Miller et al., 2014). As nursing programs refine NI content in their curriculums, assessment of students' NI knowledge and skills aligned with demands of the contemporary practice environment could inform evidence-based changes about curricular integration of NI content. If this important problem, gaining graduates competent to use NI for quality patient care, is not adequately addressed, future educational quality improvement initiatives will be needed.

This study was conducted from the perspective of nursing program leaders. Further research about the understanding of, importance of, challenges of, and successes of NI in the curriculum is needed from diverse perspectives. Further study of nursing faculty and nursing students could offer valuable insights to complement those of program leaders. Additionally, clinical leaders, faculty, and students in other health professions could help inform this work.

## **Conclusion**

Nursing informatics is an inherent part of contemporary healthcare. Educating future, baccalaureate-prepared nurses with a solid understanding and sound application of NI knowledge and skills is imperative for providing safe, quality patient care. Multiple challenges to curricular integration of NI exist, but serve as impetus for nursing program leaders and faculty to initiate discussions and implement problem-solving strategies to limit these barriers. In addition, capitalizing on the success strategies mentioned in this study could help educate a new nursing workforce well-prepared for NI in professional practice.

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## Appendix A

## Data-Information-Knowledge-Wisdom Model Framework

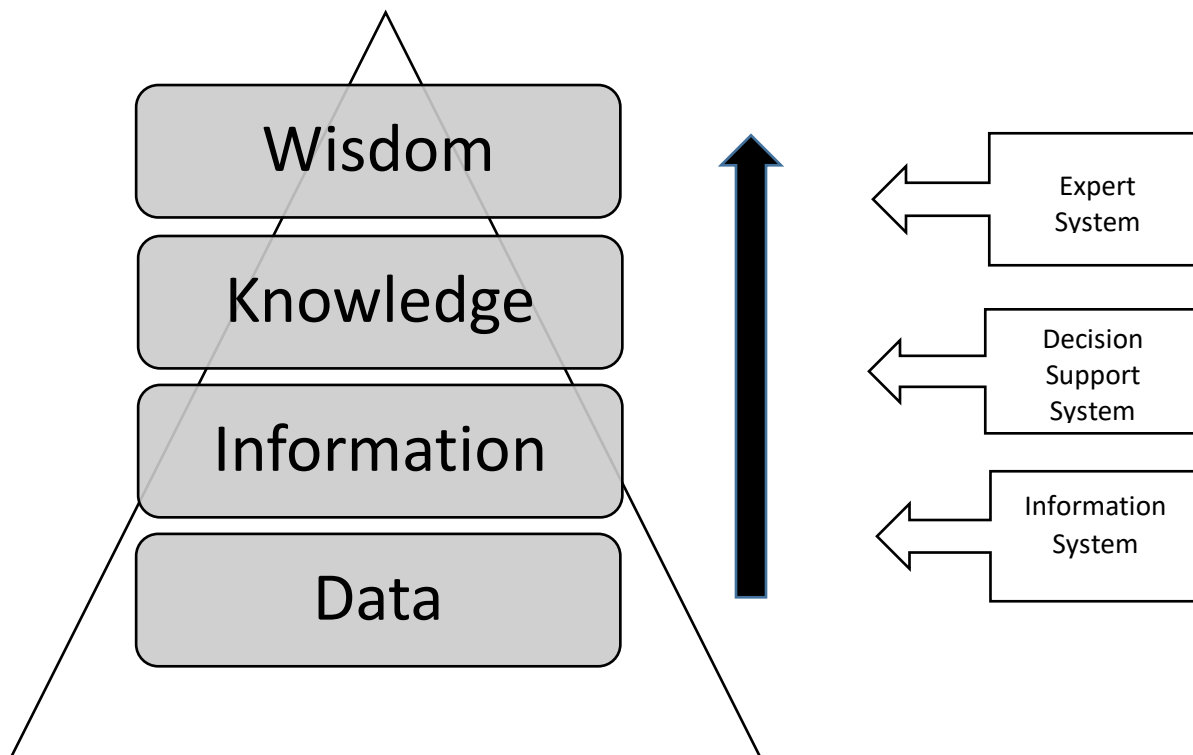
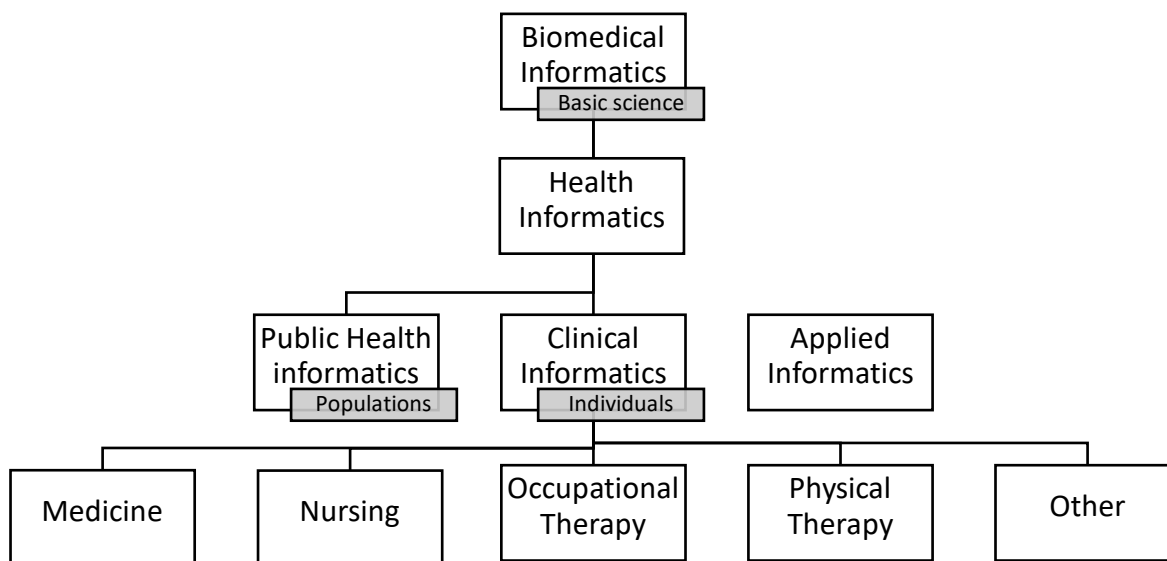


Figure A1. Adapted from “Moving from Data to Expert Systems Version” of the DIKW framework by R. Nelson, copyright 2013. In *Nursing Informatics Scope and Standards of Practice* (2<sup>nd</sup> ed.), p. 6. Copyright 2015 by the American Nurses Association (ANA).



*Appendix B*

Types of Health-related Informatics



*Figure B1.* Adapted from “Joint AMIA/AHIMA Summary of Their Relationship and Links to the Informatics Field,” by the American Medical Informatics Association (AMIA), 2012, para. 4. Copyright 2012 by the AMIA, and “A Stimulus to Define Informatics and Health Information Technology,” by W. Hersh, 2009, *BMC Medical Informatics and Decision Making*, 9, p. 2. Copyright 2009, Hersh, BioMed Central Ltd.

## Appendix C

Table C1

## TIGER Informatics Competencies

<b>Basic Computer Competencies</b>	
Concepts of Information and Communication Technology	Understand and explain concepts of information and communication technology
Using the Computer and Managing Files	Identify, describe, and demonstrate select computer use and managing files skills
Word Processing	Identify, describe, and demonstrate selected word processing skills
Web Browsing and Communication	Identify, describe, and demonstrate web browsing and communication skills and processes
<b>Information Literacy Competencies</b>	
Identify information needed for a specific purpose	Determine the nature and extent of the information needed
Locate pertinent information	Access needed information effectively and efficiently
Evaluate the information	Evaluate information and its sources critically and incorporate selected information into his or her knowledge base and value system
Apply it correctly	Individually or as a member of a group, use information effectively to accomplish a specific purpose
	Evaluate outcomes of the use of information
<b>Information Management Competencies</b>	
Concepts <ul style="list-style-type: none"> <li>Health Information Systems (HIS)</li> <li>HIS Types</li> </ul>	<ul style="list-style-type: none"> <li>Verbalize the importance of HIS to clinical practice</li> <li>Have knowledge of various types of HIS and their clinical and administrative uses</li> </ul>
Due Care <ul style="list-style-type: none"> <li>Confidentiality</li> <li>Access Control</li> <li>Security</li> </ul>	<ul style="list-style-type: none"> <li>Assure confidentiality of protected patient health information when using HIS under his or her control</li> <li>Assure access control in the use of HIS under his/her control</li> <li>Assure the security of HIS under his/her control</li> </ul>
User Skills <ul style="list-style-type: none"> <li>Navigation</li> <li>Decision Support</li> <li>Output Reports</li> </ul>	<ul style="list-style-type: none"> <li>Have the user skills—navigation, decision support, and output reports as outline in the direct care component of the HO7 EHR model</li> </ul>
Policy and Procedures <ul style="list-style-type: none"> <li>Principles</li> </ul>	<ul style="list-style-type: none"> <li>Understand the principles upon which organizational and professional HIS use by healthcare professionals and consumers are based</li> </ul>

*Note.* Adapted from the “TIGER Informatics Competencies Collaborative (TICC) Final Report,” by B. Gugerty and C. Delaney, 2007, pp. 3-8. Copyright 2009 by the TIGER Informatics Competencies Collaborative (TICC).

## Appendix D

Table D1

## QSEN Informatics Competencies

Knowledge	Skills	Attitudes
<ul style="list-style-type: none"> <li>Explain why information and technology skills are essential for safe patient care</li> </ul>	<ul style="list-style-type: none"> <li>Seek education about how information is managed in care settings before providing care</li> <li>Apply technology and information management tools to support safe processes of care</li> </ul>	<ul style="list-style-type: none"> <li>Appreciate the necessity for all health professionals to seek lifelong continuous learning of information technology skills</li> </ul>
<ul style="list-style-type: none"> <li>Identify essential information that must be available in a common database to support patient care</li> <li>Contrast benefits and limitations of different communication technologies and their impact on safety and quality</li> </ul>	<ul style="list-style-type: none"> <li>Navigate the electronic health record</li> <li>Document and plan patient care in an electronic health record</li> <li>Employ communication technologies to coordinate care for patients</li> </ul>	<ul style="list-style-type: none"> <li>Value technologies that support clinical decision-making error prevention, and care coordination</li> <li>Protect confidentiality of protected health information in electronic health records</li> </ul>
<ul style="list-style-type: none"> <li>Describe examples of how technology and information management are related to the quality and safety of patient care</li> <li>Recognize the time, effort, and skill required for computers, databases and other technologies to become reliable and effective tools for patient care.</li> </ul>	<ul style="list-style-type: none"> <li>Respond appropriately to clinical decision-making supports and alerts</li> <li>Use information management tools to monitor outcomes of care processes</li> <li>Use high quality electronic sources of healthcare information</li> </ul>	<ul style="list-style-type: none"> <li>Value nurses' involvement in design, selection, implementation, and evaluation of information technologies to support patient care</li> </ul>

*Note.* Adapted from “Quality and Safety Education for Nurses” by Cronenwett et al., 2007, *Nursing Outlook*, 55, p. 129. Copyright 2007 by Mosby.

## *Appendix E*

### AACN Essentials of Baccalaureate Education for Professional Nursing Practice

#### Essential IV: Information Management and Application of Patient Care Technology

The baccalaureate program prepares the graduate to:

1. Demonstrate skills in using patient care technologies, information systems, and communication devices that support safe nursing practice.
2. Use telecommunication technologies to assist in effective communication in a variety of healthcare settings.
3. Apply safeguards and decision making support tools embedded in patient care technologies and information systems to support a safe practice environment for both patients and healthcare workers.
4. Understand the use of CIS systems to document interventions related to achieving nurse sensitive outcomes.
5. Use standardized terminology in a care environment that reflects nursing's unique contribution to patient outcomes.
6. Evaluate data from all relevant sources, including technology, to inform the delivery of care.
7. Recognize the role of information technology in improving patient care outcomes and creating a safe care environment.
8. Uphold ethical standards related to data security, regulatory requirements, confidentiality, and clients' right to privacy.
9. Apply patientcare technologies as appropriate to address the needs of a diverse patient population.
10. Advocate for the use of new patient care technologies for safe, quality care.
11. Recognize that redesign of workflow and care processes should precede implementation of care technology to facilitate nursing practice.
12. Participate in evaluation of information systems in practice settings through policy and procedure development.

*Note.* From the *AACN Essentials of Baccalaureate Education for Professional Nursing Practice* (Essential IV), p. 18-19. Copyright 2008 by the American Association of Colleges of Nursing.

## Appendix F

Table F1

## ANA Informatics Competencies by NI Functional Areas

Competency Category	Knowledge and Skill	Beginning Nurse	Experienced Nurse
Computer Literacy			
	Administration	X <sup>a</sup>	
	Communication	X	X
	Data Access	X	
	Documentation	X	X
	Education	X	X
	Monitoring	X	X
	Basic Desktop Software	X	X
	Systems		X
Information Literacy			
	Evaluation		X
	Role		X
	System Maintenance		X
	Impact	X	X
	Privacy/Security	X	X
	Systems	X	X
	Research		X
	Organization Change Management		X
	Standards for Privacy & Security	X	X
	Adapting information technology as a primary means of patient safety	X	X

*Note.* Adapted from the “ANA Informatics Competencies by NI Functional Areas” table in *Nursing Informatics Scope and Standards of Practice* (2<sup>nd</sup> ed.), pp. 38-39. Copyright 2008 by the American Nurses Association.

<sup>a</sup>Cells marked with an “X” indicate competency expected at that level.

*Appendix G*

## Permission to Attend KACN Meeting

Monday, December 05, 2016 9:11 PM

Lisa.

Sounds good. Just send me the packet and I will forward to KACN members.

Sincerely,

Linda

Sent from my iPhone

On Dec 5, 2016, at 2:29 PM, Lisa Larson <[llarson2@kumc.edu](mailto:llarson2@kumc.edu)> wrote:

Dr. Adams-Wendling,

As we have previously discussed by phone, I am a University of Kansas PhD nursing student in the dissertation phase of my doctoral program. I am interested in the perceptions and experiences of baccalaureate nursing program leaders related to nursing informatics in the nursing education setting. I am formally requesting permission to present my study plans at the February KACN phone conference. As we discussed, I would then attend the spring, 2017, KACN meeting, distribute and collect surveys, and offer a focus group session(s) to the members attending the meeting.

In preparation for this work, I would ask that you forward a study packet to the KACN group members 1-2 weeks prior to the Wichita Spring meeting. The packet includes an invitation to participate letter, consent forms, brief written survey, the 2008 ANA nursing informatics definition, and QSEN informatics competencies

We have discussed this research study in brief, but I would be happy to provide any further information you request. Please contact my adviser Dr. Bonnel ([wbonnel@kumc.edu](mailto:wbonnel@kumc.edu)) or myself if further information is needed.

Thank you for your time and consideration of my request.

Sincerely,

Lisa Larson

## Appendix H

### Announcement - Study on Nursing Informatics

Good morning. My name is Lisa Larson, and I am a nursing PhD student at KU. First, I would like to thank Dr. Adams-Wendling and members of the KACN council for allowing me this time to briefly introduce my dissertation research study, which will be conducted at the KACN council meeting in April. This study has been approved by the student researcher's dissertation committee and reviewed by the Human Subjects Committee at KUMC.

My interest, and the purpose of this qualitative research study is to describe the perceptions and experiences of baccalaureate nursing program leaders related to nursing informatics in Kansas nursing education settings. The results of this study will help the researcher learn more about the current state of nursing informatics in the baccalaureate nursing curriculum and the associated challenges integrating informatics into the nursing curriculum.

There are two parts to this study, a written survey and attendance at one of two focus group sessions, scheduled after the conclusion of the April meeting. The written survey consists of eight demographic items and four survey questions. The written survey will be sent via email to all KACN members two weeks prior to the April meeting. You will be asked to complete the survey and bring a hard copy of the survey with you to the meeting.

There will be two, audio recorded focus groups, scheduled one hour apart at the conclusion of the council meeting. Each focus group will last approximately one hour. Participants in the discussion will be given the opportunity to share, for example, how nursing informatics impacts their nursing curriculum and the challenges and the strategies and challenges of incorporating nursing informatics into the curriculum.

Participation in the study is voluntary and confidential. I greatly appreciate your consideration and willingness to participate in this study about nursing informatics. Your participation will be a valuable asset to my learning.

Thank you.



*Appendix I*

## Invitation to Participate in a Study on Nursing Informatics

(Email to Potential Participants)

Date:

Dear Nursing Deans, Directors, and Chairpersons,

I am a nursing PhD student at the University of Kansas Medical Center (KUMC) School of Nursing seeking participants for a research study being conducted as part of my qualitative dissertation research in the nursing PhD program. The purpose of this research study is to describe the perceptions and experiences of baccalaureate nursing faculty related to nursing informatics in the nursing education setting.

You were identified as a potential participant based on your position as a nursing leader in a baccalaureate nursing education program in Kansas. Participation in the study is voluntary and confidential. No personal identifiers linking you to study results will be made.

There are no identifiable risks to participating in the study. You may choose at any time before or during the study to stop participating. A possible benefit to you as a nursing education leader is the opportunity to engage in discussion about nursing informatics issues with peers in similar professional roles. It is desired that the results of this study will help the researcher learn more about the current state of nursing informatics in the baccalaureate nursing education curriculum and the associated challenges integrating informatics into the nursing curriculum.

Study data will be collected using a written survey provided one to two weeks prior to the April, KACN meeting, and also focus group (s) discussion following the KACN meeting. If you choose to participate, you will be asked to complete and return the written survey at the April, KACN meeting. You will also be asked to attend one of two scheduled focus group interview

sessions after the conclusion of the KACN meeting. The focus group interview will last approximately one hour. The interview will be audio-taped for data analysis. All information provided by you will remain confidential. All information, audio-taped or hard-copy documents, will be kept in a secure, locked location accessible only by the student researcher. Electronic data will be stored on password-protected electronic files.

If you are interested in participating in this study, please indicate your willingness to participate in the study at the scheduled KACN meeting. A copy of the research consent form will be provided at the meeting and will be completed prior to the focus group interview. Completion of the written survey implies consent. This study has been approved by the student researcher's five-member dissertation committee and the Human Subjects Committee at KUMC. If you have any questions about your rights as a research participant or concerns related to the study, you may contact:

Human Subjects Committee  
University of Kansas Medical Center  
913-588-5757 or 1-877-588-5757

or

Dr. Wanda Bonnel, PhD, RN  
Dissertation Chair  
Phone: 913-588-3363  
E-mail: wbonnel@kumc.ed

Sincerely,

Lisa R. Larson  
Nursing PhD Student  
University of Kansas Medical Center School of Nursing

## *Appendix J*

### Focus Group Research Consent Form

**TITLE OF STUDY:** Perceptions and Experiences of Baccalaureate Nursing Program Leaders Related to Nursing Informatics

You are being asked to participate in a research study conducted by Lisa Larson, KUMC School of Nursing PhD student. Dr. Wanda Bonnel is her chair and co-investigator. You are being asked to take part in this study because you are a baccalaureate degree nursing program leader with membership in the KACN council and are attending the April, 2017, KACN council meeting in Wichita, Kansas.

This research is voluntary and you may withdraw at any time. There will be no penalty if you decide not to participate or if you withdraw before completion of the study. Not participating will also have no effect on current or future employment with the University of Kansas Medical Center.

This consent form explains what you are requested to do if you are in the study and the possible risks and benefits of participating in the study.

### **BACKGROUND**

Nursing informatics is a core competency in baccalaureate nursing education programs, but is a relatively new concept to nursing. Competency in nursing informatics basically refers to the knowledge and skills necessary to management health information using health information technologies. With the inception of technology used to manage patient health information, all practicing nurses are required to be competent in nursing informatics skills. This necessitates that nursing education programs adequately prepare students with the necessary nursing informatics knowledge and skills to enter professional practice. Because of factors such as multiple definitions of nursing informatics and diverse faculty experience with informatics, nursing informatics may be challenging to integrate into the nursing curriculum.

### **PURPOSE**

By doing this study, we hope to gain information that is helpful to others in similar situations. The primary purpose of this research is to examine baccalaureate nursing program leaders' perceptions and experiences related to nursing informatics in the nursing education setting.

### **PROCEDURES**

Focus groups will be scheduled at a convenient time following the council meeting. If you agree to participate in this study, your participation will last approximately one hour with no follow-up commitments. You are invited to participate in one of two focus groups that best meets your time commitments. The groups will be held in a private area of the conference center. Your

participation will involve a focus group discussion, with approximately four to six individuals, about nursing informatics in the baccalaureate nursing curriculum.

### **RISKS**

You may feel uncomfortable discussing your experiences. If at any point during the study you are not comfortable providing a response, you may choose not to answer or completely stop participating in the study.

### **BENEFITS**

There are no specific benefits to participating in this study, however, you may gain insight into some aspect of nursing informatics by participating in the study.

### **NEW FINDING STATEMENT**

The researchers will share any new information regarding the study that may affect your decision about participating in this study. You may be asked to sign a new consent form if this occurs.

### **COSTS**

There is no cost for participating in this study.

### **PAYMENT TO PARTICIPATE**

There is no payment for participating this study.

### **INSTITUTIONAL DISCLAIMER STATEMENT**

If you think you have been harmed as a result of participating in research at the University of Kansas Medical Center (KUMC), you should contact the Director, Human Research Protection Program, Mail Stop #1032, University of Kansas Medical Center, 3901 Rainbow Blvd, Kansas City, KS 66160. Under certain conditions, Kansas state law or the Kansas Tort Claims Act may allow payment to persons who are injured in research at KUMC.

### **CONFIDENTIALITY**

The researchers will protect your information as required by law. Absolute confidentiality cannot be guaranteed due to persons outside the research team that may need to look at the study records. The researchers may publish the group results of the study only. Your name will not be used in any publication or presentation about the study. Transcriptions will be shared with the dissertation chair via KUMC secure file transfer system.

## PARTICIPANT RIGHTS AND WITHDRAWAL FROM THE STUDY

You may stop participating in the study at any time. The investigator conducting the study may discontinue the study for any reason without your consent.

## QUESTIONS

Before you sign this form, Lisa Larson, the student researcher should answer all your questions. You can contact Lisa Larson (785-643-2041) or talk to her advisor Dr. Bonnel, if you have any more questions, suggestions, concerns or complaints after signing this form (wbommel@kumc.edu). If you have any questions about your rights as a research subject, or if you want to talk with someone who is not involved in the study, you may call the Human Subjects Committee at (913) 588-1240. You may also write the Human Subjects Committee at Mail Stop #1032, University of Kansas Medical Center, 3901 Rainbow Blvd., Kansas City, KS 66160

## CONSENT

Lisa Larson, the student researcher, has given you information about this research study. She has explained what will be done and how long it will take. She has explained that results will be reported as aggregate, de-identified data. Additionally, she has explained any inconvenience, discomfort or risks that may be experienced during this study.

By signing this form, you say that you freely and voluntarily consent to participate in this research study. You have read the information and had your questions answered. ***You will be given a signed copy of the consent form to keep for your records.***

\_\_\_\_\_  
Print Participant's Name

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Print Name of Person Obtaining Consent

\_\_\_\_\_  
Signature of Person Obtaining Consent

\_\_\_\_\_  
Date

## *Appendix K*

### Written Survey - Waiver of Written Documentation of Consent

#### **TITLE OF STUDY:** Perceptions and Experiences of Baccalaureate Nursing Program Leaders Related to Nursing Informatics

You are being asked to participate in a research study conducted by Lisa Larson, KUMC School of Nursing PhD student. Dr. Wanda Bonnel is her chair and co-investigator. You are being asked to take part in this study because you are a baccalaureate degree nursing program leader with membership in the KACN council and will be attending the April, 2017, KACN council meeting in Wichita, Kansas.

This research is voluntary and you may withdraw at any time. There will be no penalty if you decide not to participate or if you withdraw before completion of the study. Not participating will also have no effect on current or future employment with the University of Kansas Medical Center.

This consent form explains what you are requested to do if you are in the study and the possible risks and benefits of participating in the study.

#### **BACKGROUND**

Nursing informatics is a core competency in baccalaureate nursing education programs, but is a relatively new concept to nursing. Competency in nursing informatics basically refers to the knowledge and skills necessary to management health information using health information technologies. With the inception of technology used to manage patient health information, all practicing nurses are required to be competent in nursing informatics skills. This necessitates that nursing education programs adequately prepare students with the necessary nursing informatics knowledge and skills to enter professional practice. Because of factors such as multiple definitions of nursing informatics and diverse faculty experience with informatics, nursing informatics may be challenging to integrate into the nursing curriculum.

#### **PURPOSE**

By doing this study, we hope to gain information that is helpful to others in similar situations. The primary purpose of this research is to examine baccalaureate nursing program leaders' perceptions and experiences related to nursing informatics in the nursing education setting.

#### **PROCEDURES**

If you agree to participate in the written survey portion of this study, your participation will last approximately 20 – 30 minutes. Your participation will involve a written survey regarding your experiences as a nursing program leader related to nursing informatics. The ANA (2008) definition of nursing informatics, and QSEN (2007) informatics competencies will be shared as a

potential resource for you. If you have further interest in this study, you will also be invited to participate in an optional focus group interview session.

### **RISKS**

You may feel uncomfortable writing about your experiences. If at any point during the study you are not comfortable providing a response, you may choose not to answer or completely stop participating in the study.

### **BENEFITS**

There are no specific benefits to participating in this study, however, you may gain insight into some aspect of nursing informatics by participating in the study.

### **NEW FINDING STATEMENT**

The researchers will share any new information regarding the study that may affect your decision about participating in this study. You may be asked to sign a new consent form if this occurs.

### **COSTS**

There is no cost for participating in this study.

### **PAYMENT TO PARTICIPATE**

There is no payment for participating this study.

### **INSTITUTIONAL DISCLAIMER STATEMENT**

If you think you have been harmed as a result of participating in research at the University of Kansas Medical Center (KUMC), you should contact the Director, Human Research Protection Program, Mail Stop #1032, University of Kansas Medical Center, 3901 Rainbow Blvd, Kansas City, KS 66160. Under certain conditions, Kansas state law or the Kansas Tort Claims Act may allow payment to persons who are injured in research at KUMC.

### **CONFIDENTIALITY**

The researchers will protect your information as required by law. Absolute confidentiality cannot be guaranteed due to persons outside the research team that may need to look at the study records. The researchers may publish the group results of the study only. Your name will not be used in any publication or presentation about the study. Transcriptions will be shared with the dissertation chair via KUMC secure file transfer system.

## **PARTICIPANT RIGHTS AND WITHDRAWAL FROM THE STUDY**

You may stop participating in the study at any time. The investigator conducting the study may discontinue the study for any reason without your consent.

## **QUESTIONS**

Before completing the written survey, Lisa Larson, the student researcher, should answer all your questions. You can talk to the researchers Lisa Larson (785-643-2041) or Dr. Wanda Bonnel her advisor (wbonnel@kumc.edu) if you have any more questions, suggestions, concerns or complaints after signing this form. If you have any questions about your rights as a research subject, or if you want to talk with someone who is not involved in the study, you may call the Human Subjects Committee at (913) 588-1240. You may also write the Human Subjects Committee at Mail Stop #1032, University of Kansas Medical Center, 3901 Rainbow Blvd., Kansas City, KS 66160

## **CONSENT**

Lisa Larson, the student researcher, has given you information about this research study. She has explained what will be done and how long it will take. She has explained that results will be reported as aggregate, de-identified data. Additionally, she has explained any inconvenience, discomfort or risks that may be experienced during this study.



*Appendix L*

Survey of Nursing Program Leaders on Nursing Informatics

Please complete the following survey questions. Thank you for your time and willingness to share your expertise.

**Demographic Questions**

1) What is your current leadership position in the baccalaureate nursing program?

Dean/Associate Dean\_\_\_\_\_ Director\_\_\_\_\_ Chairperson\_\_\_\_\_ Other\_\_\_\_\_

2) Age, in years (please circle): 20-29    30-39    40-49    50-59    60 or >

3) Highest degree obtained (please circle): Master's    Doctorate

4) How many years have you worked in a baccalaureate nursing program setting?

5) How many years have you worked in your current position?

6) In what type of academic institution do you work (please check response)?

Public\_\_\_\_\_ Private\_\_\_\_\_ Other (please specify)\_\_\_\_\_

7) Is your academic institution located in a rural or urban area, by numbers of people?

Rural (less than 2,500)\_\_\_\_\_ Small urban (2,500-49,999)\_\_\_\_\_

Urban (50,000 and over)\_\_\_\_\_

8) What is the size of your academic institution by total student enrollment?

2,999 or less (very small/small)\_\_\_\_\_ 3,000-9,999 (medium)\_\_\_\_\_

10,000 or > (large/very large)\_\_\_\_\_

**Survey Questions**

Please address or ask a super user the following questions:

1. What does the term “nursing informatics” mean in your curriculum?



*Appendix M*

## Focus Group Interview Prompts

1. In what ways does NI impact your nursing education curriculum?

Probes: positive/negative impacts  
EHRs (academic, clinical experiences)

2. What strategies have you and your nursing faculty used that have worked well to integrate nursing informatics into your curriculum?

Probes: activity/ assignment (didactic/clinical)  
IPE  
NI courses/integrated

3. What challenges have you and your nursing faculty experienced when integrating nursing informatics in your nursing education curriculum?

Probe: facilitate integration?

4. What do you see as your role and responsibilities as a nursing program leader with NI in your curriculum?

Probe: your needs?

*Appendix N*

Table O1

## Coding Sheet

<b>Significant Statement/Meaning Unit</b>	<b>Restatement/Condensed Meaning Unit (CM)</b>	<b>Formulated Meaning/Code (CO)</b>	<b>Comments</b>

## Appendix O

### Summary of Survey Data

Q1 What does the term "nursing informatics mean in your curriculum?"

- Information systems
- information literacy
- methods to discover and use information
- navigating technology
- QSEN definition (2<sup>a</sup>)
- Understanding technology utilization to document and access information
- Input, maintenance, and extraction of data for decision-making and improving patient care
- Use of computer-accessible tools for nursing education

Q2 Describe one or more strategies you and your faculty use to integrate nursing informatics in your nursing education curriculum.

- Integrated across the curriculum
- Online assignment (2)
- Working with databases
- using an academic EHR
- online electronic resources (i.e. drug reference)
- online learning systems (i.e. online Blackboard learning management system)
- Levelled skills content

Q3 Describe one or more challenges you and your nursing faculty have experienced when integrating nursing informatics content in your nursing education curriculum.

- Time (3)
- availability of faculty development programs
- helping students recognize value of NI (2)
- getting commitment to use academic EHRs in simulations
- getting commitment to run simulations
- Limitations of academic EHRs
- Financial resources
- Lack of faculty knowledge of NI

Q4 If you rated your most knowledgeable and skilled faculty in nursing informatics according to the QSEN informatics competencies using Benner's novice-to-expert model, how would you rated this faculty?

- Novice (2)
- Advanced beginner (1; age dependent, if over "40-ish")
- Competent (2)
- Proficient (2; one response age dependent, if under "40-ish"))
- Expert (1)

Figure P1. <sup>a</sup>Responses are by a single participant unless otherwise noted in parentheses.

## Appendix P

Table P1

*Demographic Characteristics of Survey Respondents*

Characteristic	(n = 9)	Item Descriptor	Range	M	SD
Current leadership position in BSN program	3	Dean/Associate Dean			
	1	Director			
	2	Chairperson			
	3	Other <sup>a</sup>			
Age, in years	1	30-39			
	1	40-49			
	2	50-59			
	5	60 or >			
Highest educational degree obtained	1	Masters			
	8	Doctorate			
Years worked in a BSN setting <sup>b</sup>			1.5 to 29	10.56	3.25
Years worked in current position <sup>b</sup>			1 to 14	5.50	2.35
Type of academic institution where employed	5	Public			
	4	Private			
	0	Other			
Location of academic institution by numbers of people <sup>c</sup>	0	Rural (less than 2,500)			
	4	Small Urban (2,500-49,999)			
	5	Urban (50,000 and >)			
Size of academic institution by student enrollment <sup>d</sup>	3	2,999 or < (very small/small)			
	4	3,000-9,999 (medium)			
	2	10,000 or > (large)			

Note. BSN = bachelor of science of nursing.

<sup>a</sup>One respondent identified as both a director and chairperson.

<sup>b</sup>One respondent did not complete this item (n = 8).

<sup>c</sup>Location classifications from "Geography: Urban and Rural" by the US Census Bureau, copyright 2016.

<sup>d</sup>Size classifications from "Carnegie Classification of Institutions of Higher Education: Size and Setting Classification Description [2015 edition]," by the Indiana University Center on Postsecondary Research, copyright 2017.

## Appendix Q

## Categories of Challenges and Success Strategies of NI Curricular Integration

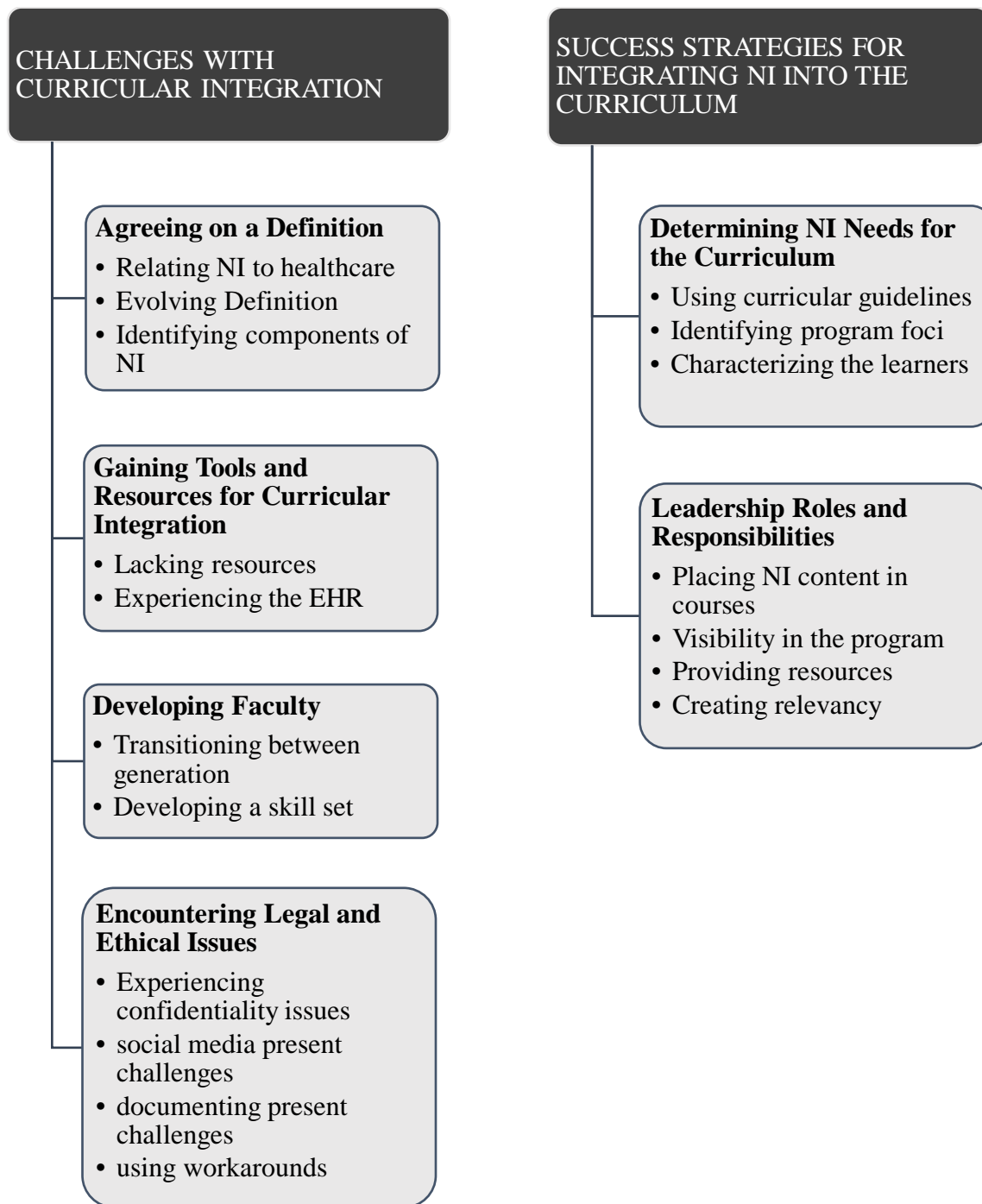


Figure Q1. The two overarching study categories with subcategories.