SIXTH EDITION

NURSING INFORMATICS

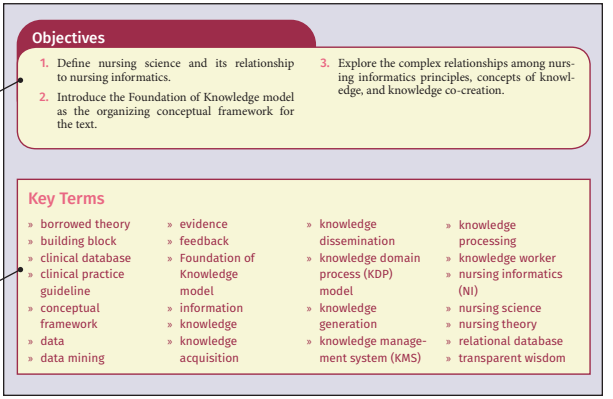
and the Foundation of Knowledge

The Pedagogy

Nursing Informatics and the Foundation of Knowledge, Sixth Edition, drives comprehension through a variety of strategies geared toward meeting the learning needs of students while also generating enthusiasm about the topic. This interactive approach addresses diverse learning styles, making this the ideal text to ensure mastery of key concepts. The pedagogical aids that appear in most chapters include the following:

Objectives The objectives provide a snapshot of the key information encountered in each chapter. They serve as a checklist to help guide and focus study. Objectives can also be found within the text's online resources.

Key Terms Key terms are found in a list at the beginning of each chapter. Studying these terms will create an expanded vocabulary.



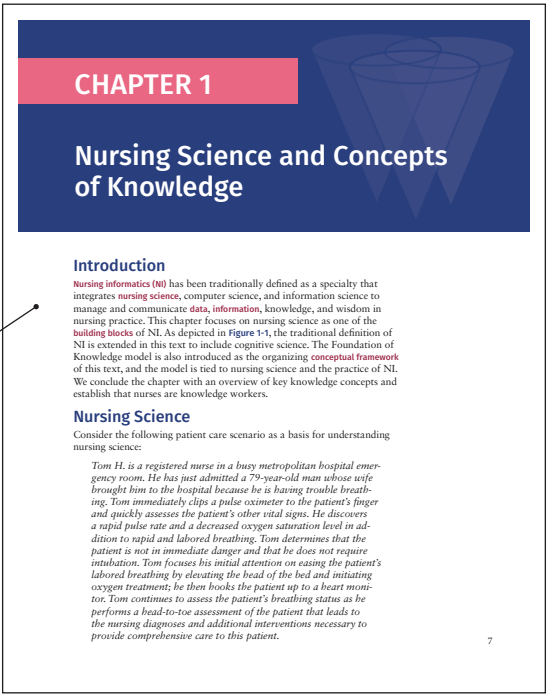
Objectives

1. Define nursing science and its relationship to nursing informatics.
2. Introduce the Foundation of Knowledge model as the organizing conceptual framework for the text.
3. Explore the complex relationships among nursing informatics principles, concepts of knowledge, and knowledge co-creation.

Key Terms

- borrowed theory
- building block
- clinical database
- clinical practice guideline
- conceptual framework
- data
- data mining
- evidence
- feedback
- Foundation of Knowledge model
- information
- knowledge
- knowledge acquisition
- knowledge dissemination
- knowledge domain process (KDP) model
- knowledge generation
- knowledge management system (KMS)
- knowledge processing
- knowledge worker
- nursing informatics (NI)
- nursing science
- nursing theory
- relational database
- transparent wisdom

Introductions An introduction is found at the beginning of each chapter. The introduction provides an overview highlighting the importance of the chapter's topical area. It also helps keep students focused as they read.



CHAPTER 1

Nursing Science and Concepts of Knowledge

Introduction

Nursing informatics (NI) has been traditionally defined as a specialty that integrates nursing science, computer science, and information science to manage and communicate data, information, knowledge, and wisdom in nursing practice. This chapter focuses on nursing science as one of the building blocks of NI. As depicted in Figure 1-1, the traditional definition of NI is extended in this text to include cognitive science. The Foundation of Knowledge model is also introduced as the organizing conceptual framework of this text, and the model is tied to nursing science and the practice of NI. We conclude the chapter with an overview of key knowledge concepts and establish that nurses are knowledge workers.

Nursing Science

Consider the following patient care scenario as a basis for understanding nursing science:

Tom H. is a registered nurse in a busy metropolitan hospital emergency room. He has just admitted a 79-year-old man whose wife brought him to the hospital because he is having trouble breathing. Tom immediately clips a pulse oximeter to the patient's finger and quickly assesses the patient's other vital signs. He discovers a rapid pulse rate and a decreased oxygen saturation level in addition to rapid and labored breathing. Tom determines that the patient is not in immediate danger and that he does not require intubation. Tom focuses his initial attention on easing the patient's labored breathing by elevating the head of the bed and initiating oxygen treatment; he then hooks the patient up to a heart monitor. Tom continues to assess the patient's breathing status as he performs a head-to-toe assessment of the patient that leads to the nursing diagnoses and additional interventions necessary to provide comprehensive care to this patient.

7

RESEARCH BRIEFS

CONSUMER PERCEPTIONS OF HEALTH INFORMATION ON THE WEB

Using an online survey of 1,227 randomly selected respondents, Bodkin and Miaoulis (2007) sought to describe the characteristics of information seekers on eHealth websites, the types of information they seek, and their perceptions of the quality and ethics of the websites. Of the respondents, 74% had sought health information on the web, with women accounting for 55.8% of the health information seekers. A total of 50% of the seekers were between 35 and 54 years of age. Nearly two thirds of the users began their searches using a general search engine rather than a health-specific site, unless they were seeking information related to symptoms or diseases. The top reasons for seeking information were related to diseases or symptoms of medical conditions, medication information, health news, health insurance, locating a doctor, and Medicare or Medicaid information. The level of education of information seekers was related to the ratings of website quality in that more educated seekers found health information websites more understandable but were more likely to perceive bias in the website information. The researchers also found that the ethical codes for eHealth websites seem to be increasing consumers' trust in the safety and quality of information found on the web but that most consumers are not comfortable purchasing health products or services online.

ETHICS AND CONSUMER ENGAGEMENT IN NURSING

Hassmiller and Bilazarian (2018) explored consumer engagement and its relationship to safety, quality, and ethics to identify promising practices and leadership strategies. The literature review was supplemented with interviews from 25 key nursing informants. They described examples illustrating business, ethical, and quality cases and noted that we must pay attention to all three types of cases for the synergy needed for optimal clinical effectiveness and consumer engagement. Interviewees highlighted the ethics cases and the idea that nurse leaders have an ethical responsibility to lead in the area of consumer engagement by committing to the values of compassion, patient advocacy, and consumer engagement and translating those values to the patient. It was important to note that technology can add to or detract from opportunities for engagement with consumers based on the use of the tools and the amount of disruption. This study identified strategies and organizational changes necessary to enhance partnering with healthcare consumers while supporting the quality and safety, business, and ethics cases needed for consumer engagement.

Research Briefs Research briefs are summaries of research meant to encourage students to access current research in the field.

Inserts These highlighted inserts provide the reader with more detailed information and points to ponder.

BOX 16-2 ARTIFICIAL INTELLIGENCE (AI) APPLIED AS A PATIENT ENGAGEMENT STRATEGY

In the competitive and confusing healthcare delivery system of today, it is important that providers be able to personalize each patient's experience. Open communication is key to remaining current with the needs of patients while making them feel connected to the practice and satisfied with the care they receive. In a blog post on Seismic (2017), it was stated that "[w]hen it comes to patient engagement, the promise of AI is to improve the experience by anticipating patient needs, providing faster and more effective outcomes" (para. 7). Seismic recommended the following:

- Engaging patients with insights that are conversational and contextual, and adjusting based on the situation to respond in real time.
- Teaming providers with the intelligent guidance of AI so they can provide patients with next-best actions, personalized to them.
- Empowering patients who want to actively participate and engage in their health with intelligent guidance and support when needed. (para. 7)

The blog post stated it best:

> *A smart machine might be able to diagnose an illness and even recommend treatment better than a doctor; however, it takes a person to sit with a patient, understand their life situation, and help determine which treatment plan is optimal.* (para. 9)

Heath (2019) stated that a "survey of 2,000 healthcare consumers and 200 business decision makers (BDMs) revealed that AI may soon be the future of patient care" (para. 2). AI must not only engage patients but also engage healthcare providers and facilitate their ability to provide healthcare. Marr (2018) stated that AI can help with critical thinking, clinical judgment, image analysis, robotic-assisted surgery, and diagnosing. He also described providing virtual nursing assistants to monitor patients and facilitate communication and information exchange between face-to-face visits. Heath (2018) discussed the high patient satisfaction scores when patients are provided virtual care: "[F]orty-seven percent of patients said they prefer a more immediate, virtual care encounter than having to wait for an encounter that is in person" (para. 7). AI in the form of virtual nursing assistants can help patients feel connected and engaged in their care.

Reflect on the following AI virtual patient encounter; assume each role (nurse, Craig, and patient, Mary), and assess your perspective as each one. The AI virtual nurse is known as Kate.

Working Wisdom

Since the beginning of the profession, nurses have applied their ingenuity, resourcefulness, and professional awareness of what works to adapt technology and objects to support nursing care, usually with the intention of promoting efficiency but also in support of client comfort and healing. This resourcefulness could also be applied effectively to the adaptation of information technology within the care environment, to ensure that the technology truly does serve patients, nurses, and the rest of the interprofessional team.

Consider this question: How can you develop competency in using the various computer hardware and software not only to promote efficient, high-quality nursing care and to develop yourself professionally but also to further the development of the profession's body of knowledge?

Application Scenario

Dan P. has just been accepted into the nursing informatics graduate program. In the past, he has used his 8-year-old laptop to surf the World Wide Web, exchange email with friends, and play computer games. Now, however, Dan realizes that the computer is a vital tool for his academic success, and he has saved up enough money to purchase a new laptop computer and the necessary accessories he needs to be successful. He knows that his program will entail VR and that the university has launched their public metaverse space. What questions should he ask of his nursing advisor before he decides on the laptop he should purchase? Dan reached out to his nursing advisor, Dr. Smythely, and she sent Dan a list of general university and program-specific technical requirements needed for his success (see **Box 3-3**).

After completing this chapter, how would you answer the following questions?

1. Dan is set on purchasing a new laptop. Where is his money best spent and why? Would it be better to get the most memory, the fastest processor, the most storage, or the latest operating system?
2. Dan is excited about VR but does not have a clue about which HMD would be best let alone how much they cost. Since he does not know anything about the headsets, what should he do to make an informed decision?

Working Wisdom Working wisdom allows the reader to experience an expert's practical application of knowledge and experience as they address specific situations such as walking the reader through an expert's application of the ETHICAL model or the experts' feedback in the 10 interactive case studies.

Application Scenarios Application scenarios allow the reader to see how the concepts or information can be applied to authentic or real-world situations.

Summary

The field of computer science is one of the fastest-growing disciplines. Astonishing innovations in computer hardware, software, and architecture have occurred over the past few decades, and there are no indications that this trend will come to a halt any time soon. Computers have increased in speed, accuracy, and efficiency yet now cost less and have reduced physical size compared to their forebears. These trends are predicted to continue. Current computer hardware and software serve as vital and valuable tools for both nurses and patients to engage in on-screen and online activities that provide rich access to data and information. Productivity, creativity, and communication software tools also enable nurses to work with computers to further foster knowledge acquisition and development. Wide access to vast stores of information and knowledge shared by others facilitates the emergence of wisdom in users, which can then be applied to nursing in meaningful and creative ways. It is imperative that nurses exploit the potential of the metaverse and become discerning yet skillful users of computer technology to apply the principles of nursing informatics to their practice to improve patient care and to contribute to the profession's ever-growing body of knowledge.

THOUGHT-PROVOKING QUESTIONS

1. How can knowledge of computer hardware and software help nurses to participate in information technology adoption decisions in the practice area?
2. How can new computer software help nurses engage in professional development, collaboration, and knowledge dissemination activities at their own pace and leisure?

Summaries A summary is included at the end of each chapter to provide a concise review of the material covered. The summary highlights the most important points and describes what the future holds.

Thought-Provoking Questions Students can work on these critical thinking assignments individually or as a team activity. In addition, students can delve deeper into concepts by completing these exercises online.

Case Studies Case studies are authentic, encourage active learning, and promote critical thinking skills. Students can ask questions, analyze situations, and solve problems in a real-world context.

CASE STUDY 3-1

Hospital system: Mid-Cheshire Hospitals NHS Foundation Trust

- 540 beds and community health services
- 4,500 staff across three hospital sites in northwest England

Problem: Aging infrastructure, including desktop devices that were over 10 years old, which was having a negative effect on thousands of its staff members' productivity and stressing its internal information technology help desk.

Solution from CDW: Formulating a compelling business case and implementing the following:

- Microsoft Office 365 to improve user experience; security, including email encryption; and support collaboration.
- Microsoft SharePoint platform for user collaboration.
- Windows 10 and new password reset tool to decrease help desk calls.
- Unable to replace all devices at once, CDW developed a business case to replace those devices over 10 years old; a DaaS solution delivered by CDW established a new 5-year refresh cycle.

Outcome: Infrastructure renewal is benefiting from CDW's CloudPlan service while CDW prepares for migration to Microsoft Azure* in the near future. CDW is also rolling out Cisco networking technology to enable free Wi-Fi for patients.

*Microsoft described Azure as an "ever-expanding set of cloud services" (https://azure.microsoft.com/en-us/overview/what-is-azure). In the healthcare sector, McKesson, one of the oldest and largest healthcare companies, serving more than 50% of U.S. hospitals, chose Azure (https://cloud.netapp.com/blog/azure-cvo-blg-azure-case-studies-with-cloud-volumes-ontap). McKesson needed help to meet the infrastructure needs of their clients (https://cloud.netapp.com/hubfs/success-stories/CS-McKesson.pdf, para. 1).

CDW. (n.d.). *Case study: CDW helps Mid-Cheshire NHS Trust improve patient care by replacing ageing IT infrastructure*. www.uk.cdw.com/about/case-studies/mid-cheshire-nhs-trust

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Contents

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Preface

The idea for this text originated with the development of nursing informatics (NI) classes, the publication of articles related to technology-based education, and the creation of the *Online Journal of Nursing Informatics (OJNI)*, which Dr. Dee McGonigle cofounded with Dr. Renee Eggers. Like most nurse informaticists, we fell into the specialty; our love affair with technology and gadgets and willingness to be the first to try new things helped to hook us into the specialty of informatics. The rapid evolution of technology and its transformation of the ways of nursing prompted us to try to capture the essence of NI in a text.

As we were developing the first edition, we realized that we could not possibly know all there is to know about informatics and the way in which it supports nursing practice, education, administration, and research. We also knew that our faculty roles constrained our opportunities for exposure to changes in this rapidly evolving field. Therefore, we developed a tentative outline and a working model of the theoretical framework for the text and invited participation from informatics experts and specialists around the world. We were pleased with the enthusiastic responses we received from some of those invited contributors and a few volunteers who heard about the text and asked to participate in their particular area of expertise.

In the second edition, we invited the original contributors to revise and update their chapters. Not everyone chose to participate in the second edition, so we revised several of the chapters using the original work as a springboard. The revisions to the text were guided by the contributors' growing informatics expertise and the reviews provided by textbook adopters. In the revisions, we sought to do the following:

- Expand the audience focus to include nursing students from bachelor of science (BS) through doctor of nursing practice (DNP) programs as well as nurses thrust into informatics roles in clinical agencies.
- Include, whenever possible, an attention-grabbing case scenario as an introduction or an illustrative case scenario demonstrating why the topic is important.
- Include important research findings related to the topic. Many chapters have research briefs presented in text boxes to encourage the reader to access current research.
- Focus on cutting-edge innovations, meaningful use, and patient safety as appropriate to each topic.
- Include a paragraph describing what the future holds for each topic.

New chapters that were added to the second edition included those focusing on technology and patient safety, system development life cycle, workflow analysis, gaming, simulation, and bioinformatics.

In the third edition, we reviewed and updated all the chapters, reordered some chapters for better content flow, eliminated duplicated content, split the education and research content into two sections, integrated social media content, and added two new chapters: *Data Mining as a Research Tool* and *The Art of Caring in Technology-Laden Environments*.

In the fourth edition, we reviewed and updated all the chapters based on technological advancements and changes to the healthcare arena, including reimbursement mechanisms for services.

In the fifth edition, we added specific information on informatics contributions to quality improvements, interprofessional collaboration, and pandemic response. We pared the fifth edition down to 26 chapters from the previous edition's 29; one chapter each was deleted from Sections II, V, and VII. Section I includes updates to the same five chapters on the building blocks of nursing informatics, with

extensive changes to Chapter 3, *Computer Science and the Foundation of Knowledge Model*. To improve flow, we combined content. There was a section describing a virtual reality product with access information for the reader; this product can be accessed in 2D as well as 3D. Chapter 24, *The Art of Caring in Technology-Laden Environments,* was enhanced, and Chapter 25 was replaced with *Our Expanding Realities*.

In this sixth edition, we have once again reviewed and updated all the chapters based on technological advancements and changes to the healthcare arena, including reimbursement mechanisms for services. We have added specific information on informatics contributions to quality improvements and interprofessional collaboration. The section describing a virtual reality product remains, with access information for the reader; this product can be accessed in 2D as well as 3D. This edition has been decreased to 25 chapters. Chapter 24. *Bioinformatics, Biomedical Informatics, and Computational Biology*, was eliminated by integrating this content appropriately throughout the textbook.

The major revisions follow:

Chapter 1 was enhanced by exploring the impacts of AI, cognitive systems, machine learning and predictive analytics on knowledge management in organizations, the importance of knowledge co-creation, and the characteristics of knowledge work.

Chapter 2 emphasizes the need to ethically implement ISs to mitigate impacts on users and institutions, discusses the issues associated with asset classification (i.e., drug or device), and explores issues related to IoT (Intelligence of Things; Internet of Things) and AIoT (Artificial Intelligence of Things).

Chapter 3 was heavily revised and shortened. Tables were created for computer components, summarizing major types of software and input devices. The following were added: haptics for immersive technologies and VR (Virtual Reality), VPN (Virtual Private Network) with encryption, and the introduction of the concept of the metaverse.

Chapter 4 explores AI (Artificial Intelligence), machine learning, and natural language processing.

Chapter 5 discusses the ethics of using robots as substitutes for human carers, identifies challenges and opportunities related to social media use by patients and providers, and discusses motives for seeking information and emotional support online.

Chapter 6 explores the evolution of NI definitions and shares the current NI definition. It also updates AACN education guidelines and shares 2021 informatics competencies identified in *Essentials: Core Competencies for Professional Nursing Education*.

Chapter 7 shares updates from the third edition of the ANA's *Nursing Informatics: Scope and Standards of Practice* (2022), presents ways in which INSs (Informatics Nurse Specialist) provide value, and explores trends influencing the future of NI (Nursing Informatics).

Chapter 8 was updated to reflect the concerns related to the use of personal devices in the workplace and BYOD policies, notes that CMPs (Civil Monetary Penalties) associated with PHI (Protected Health Information) breaches may increase with inflation, alerts that Privacy Rule changes are expected in mid-2023, and provides access to the global health legislation tracker.

Chapter 9 updates the description of object-oriented modeling, CASE (Computer-aided Software Engineering), and differentiates between free software and open source software.

Chapter 10 expands the discussion of interoperability and the use of metadata tagging in the interoperability context, discusses documentation integrity, introduces and defines unified communication for health care, updates ADT (Admission, Discharge, and Transfer System) description and use, and introduces CDI (Clinical Documentation Improvement).

Chapter 11 explores data visualization as a tool to model complex healthcare data and clarifies NFC (Near-field Communication) transactions. Also added is a detailed description of VR headset use and a discussion of the importance of managing HTI (Human-Technology Interaction) with new technologies.

Chapter 12 provides updated tips for creating strong passwords, expands the discussion of electronic data vulnerability, and reviews recent data breaches.

Chapter 13 emphasizes the value of process improvement theories, introduces the Patient Room 'Next' (PRN) strategy for providing high-quality healthcare regardless of patient location, and reviews the seven key steps for a quality improvement project.

Chapter 14 updates EHR (Electronic Health Record) adoption statistics and explores how interoperable EHRs facilitate data sharing.

Chapter 15 shares 10 common medical errors leading to patient deaths and access to global strategies for safety. It also explores the contributions of wearable technologies to safety and early detection of issues.

Chapter 16 shares changes in the fitness app market, explores the use of an AI-powered web-based symptom checker and medical misinformation during the pandemic, discusses the digital divide via an interactive map tool, identifies wearable technology as consumer-centric technology, and introduces virtual and augmented reality tools for engagement.

Chapter 17 describes the EPA (Environmental Protection Agency) risk assessment, introduces AI as a prediction tool for disease outbreaks, and explores quality public health messaging.

Chapter 18 provides updated healthcare spending costs. It offers a definition and explains its use to help reduce disparities. It also explores medical and nurse licensure compacts as well as telehealth support and regulations changes post-pandemic.

Chapter 19 acknowledges the pandemic's impact on telecommunications, virtual technology use, and the paradigm shift with the shutdowns. It reviews clinical replacement and augmentation with simulation, explains how adaptive learning is integrated into LMS (Learning Management System), and provides updates on Gen Z, AI, and the learning disruption caused by ChatGPT. It also provides an actual, unedited interaction with ChatGPT about AI and explores some faculty's reactions to ChatGPT or other AI products students are using.

Chapter 20 acknowledges the role of the pandemic in the escalated integration of virtual simulation and explores a new initiative at a children's hospital with VR on every unit.

Chapter 21 identifies the information literacy competency standards specific to nursing and acknowledges the role of the pandemic in accelerating the commitment to collecting healthcare data in a standardized way to facilitate data sharing and treatment outcomes.

Chapter 22 expands the former data mining chapter to include artificial intelligence, bioinformatics, and computational biology contributions to data analytics. It acknowledges the contributions of the former BD2K (Big Data to Knowledge) program, advocates for the use of EHR data for comparative effectiveness research, and identifies three main types of data analytics. Finally, this chapter incorporates information from the former Chapter 24 from the fifth edition on bioinformatics and computational biology and their contributions to data analysis.

Chapter 23 explores the potential contributions of bioinformatics and computational biology to evidence for practice, introduces the NCATS (National Center for Advancing Translational Sciences) translational science spectrum, and incorporates information from the former Chapter 24 from the fifth edition on bioinformatics and computational biology and their effects on clinical translation

Chapter 24 advocates for adding technology as a fifth dimension of the nursing paradigm, considerations for conveying caring while wearing PPE (Personal Protective Equipment), and caring encounters as communion-in-caring. It also emphasizes reflection to improve caring encounters.

Chapter 25 examines the emerging technologies evolving our sense of reality that will affect the future of health care, nursing practice, nursing informatics, and patient care. To help the reader consider the disruptive forces affecting our realities, we have provided a glimpse of patient experiences in future health care, care bots, cyborgs, and artificial intelligence. Through our use of nursing informatics in the integration of evolving technologies, we affect our reality, the reality of the healthcare industry, the reality of our patients, and the reality of the concept of the metaverse, and all of these concepts are explored in this chapter. In addition, the chapter explores haptic technology and its future in nursing, encourages the reader

to think about the impact AI will have on our reality, and includes a new section on the metaverse in which the following topics are discussed:

- Complex definition of the metaverse is provided and then a simplified one
- ChatGPT interaction: describe the concept of a metaverse to a nursing student
- The promise of the metaverse
- Four facets
- Three components
- Use cases: how the metaverse is impacting and will impact healthcare
- Challenges facing the realization of the metaverse
- Nursing role-specific challenges

In addition, the ancillary materials have been updated and enhanced to include competency-based self-assessments, mapping the content to the current NI standards, activities for both undergraduate and graduate nursing students, and 10 interactive case studies.

We believe that this text provides a comprehensive elucidation of this exciting field. Its theoretical underpinning is the Foundation of Knowledge model. This model is introduced in its entirety in the first chapter, which discusses nursing science and its relationship to NI. We believe that humans are organic information systems that are constantly acquiring, processing, and generating information or knowledge in both their professional and their personal lives. It is their high degree of knowledge that characterizes humans as extremely intelligent, organic machines. Individuals have the ability to manage knowledge—an ability that is learned and honed from birth. We make our way through life interacting with our environment and being inundated with information and knowledge. We experience our environment and learn by acquiring, processing, generating, and disseminating knowledge. As we interact in our environment, we acquire knowledge that we must process. This processing effort causes us to redefine and restructure our knowledge base and generate new knowledge. We then share (disseminate) this new knowledge and receive feedback from others. The dissemination and feedback initiate this cycle of knowledge over again, as we acquire, process, generate, and disseminate the knowledge gained from sharing and reexploring our own knowledge base. As others respond to our knowledge dissemination and we acquire new knowledge, we engage in rethinking and reflecting on our knowledge, processing, generating, and then disseminating anew.

The purpose of this text is to provide a set of practical and powerful tools to ensure that the reader gains an understanding of NI and moves from information through knowledge to wisdom. Defining the demands of nurses and providing tools to help them survive and succeed in the Knowledge Age remains a major challenge. Exposing nursing students and nurses to the principles and tools used in NI helps to prepare them to meet the challenge of practicing nursing in the Knowledge Age while striving to improve patient care at all levels.

The text provides a comprehensive framework that embraces knowledge so that readers can develop their knowledge repositories and the wisdom necessary to act on and apply that knowledge. The text is divided into seven sections.

- Section I, *Building Blocks of Nursing Informatics*, covers the building blocks of NI: nursing science, information science, computer science, cognitive science, and the ethical management of information.
- Section II, *Perspectives on Nursing Informatics*, provides readers with a look at various viewpoints on NI and NI practice as described by experts in the field.
- Section III, *Nursing Informatics Administrative Applications: Precare and Care Support*, covers important functions of administrative applications of NI.
- Section IV, *Nursing Informatics Practice Applications: Care Delivery*, covers healthcare delivery applications, including electronic health records (EHRs), clinical information systems, telehealth, patient safety, patient and community education, and care management.

- Section V, *Education Applications of Nursing Informatics*, presents subject matter on how informatics supports nursing education.
- Section VI, *Research Applications of Nursing Informatics*, covers informatics tools to support nursing research, including data mining and bioinformatics.
- Section VII, *Imagining the Future of Nursing Informatics*, focuses on the future of NI, emphasizes the need to preserve caring functions in technology-laden environments, and explores our expanding realities and the metaverse.

The introduction to each section explains the relationship between the content of that section and the Foundation of Knowledge model. This text places the material within the context of knowledge acquisition, processing, generation, and dissemination. It serves both nursing students (BS to DNP/PhD) and professionals who need to understand, use, and evaluate NI knowledge. As nursing professors, our major responsibility is to prepare the practitioners and leaders in the field. Because NI permeates the entire scope of nursing (i.e., practice, administration, education, and research), nursing education curricula must include NI. Our primary objective is to develop the most comprehensive and user-friendly NI text on the market to prepare nurses for current and future practice challenges. In particular, this text provides a solid groundwork from which to integrate NI into practice, education, administration, and research.

The goals of this text are as follows:

- Impart core NI principles that should be familiar to every nurse and nursing student.
- Challenge novices to experts concerning NI's competencies and impact on every area of nursing practice.
- Help the reader understand knowledge and how it is acquired, processed, generated, and disseminated.
- Explore the changing role of NI professionals.
- Demonstrate the value of the NI discipline as an attractive field of specialization.
- Challenge the reader to expand personal horizons to embrace emerging technologies and new realities.

Meeting these goals will help nurses and nursing students understand and use fundamental NI principles so that they efficiently and effectively function as current and future nursing professionals to enhance the nursing profession and improve the quality of health care. The authors would also like to challenge nursing informatics experts to continually expand their horizons and passion for appropriate integration of technology in all facets of nursing care. The overall vision, framework, and pedagogy of this text offer benefits to readers by highlighting established principles while drawing out new ones that continue to emerge as nursing and technology evolve.

Authors' Note

This text provides an overview of nursing informatics from the perspective of diverse experts in the field, as well as current and seminal research and literature, with a focus on nursing informatics and the Foundation of Knowledge model. We want our readers and students to focus on the relationship of knowledge to informatics and to embrace and maintain the caring functions of nursing—messages all too often lost in the romance with technology. We hope you enjoy the text!

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