In my last column (Vol. 37, No. 4, pp. 303–304), I told you about my participation in the 13th International Congress in Nursing Informatics. Each of these conferences is followed by an invitational postconference, which this year took place over three days in the lovely town of Villars-sur-Ollon, Switzerland. The 34 participants, including three students, represented academia, practice, and administration in the countries of Australia, Belgium, Brazil, Canada, China, Finland, Great Britain, Ireland, Korea, Netherlands, New Zealand, Norway, Switzerland, Taiwan, and the United States. Our charge for the postconference was to examine current and future expectations of informatics competencies for entry into practice for advanced practice nursing. The term entry into practice was used, as differing levels of education are required to enter nursing across the globe.

In preparation, each participant was asked to write a chapter that would help guide our conversations. We were divided into five groups (educators, leaders, specialists, new frontiers, and eHealth) and instructed to generate a list of expected competencies to be presented to the entire group. The final product will be a publication targeted for the end of the year.

To be able to project informatics competencies for this next generation of nurses, we started by revisiting a book published by the National League for Nursing (NLN): Preparing Nurses for Using Information Systems: Recommended Informatics Competencies (Peterson & Gerdin-Jelger, 1988). This book represented the work of the International Medical Informatics Association’s Nursing Informatics Task Force on Education, an international group that included representatives from Australia, Belgium, Canada, Denmark, Finland, Netherlands, Sweden, the United Kingdom, and the United States. It delineates competencies across three levels (user, is able to use the tool; developer, has knowledge to participate in tool development; and expert, directs development and implementation as consultant, evaluator, or researcher) for the practicing nurse, the nurse educator, the nurse leader, and the nurse researcher.

As an elder in the field and coauthor with Dr. Judith Ronald of a chapter in the 1988 book, I was asked to write the opening chapter for the 2016 postconference and talk about “Looking Back to Move Forward” (which I relabeled “From Automation to Connected Care”). Our 1988 chapter, “Computer Education for Nurses: Curriculum Issues and Guidelines,” was based on a monograph Dr. Ronald and I did in 1987 for the NLN (Ronald & Skiba, 1987). The monograph, Guidelines for Basic Computer Education in Nursing, was widely used by educators in various countries to incorporate nursing informatics into the curriculum. As you can see, the United States in the old days called it computer education. We adopted the European term nursing informatics in the late 1980s.

A LOOK AT THE PAST
It was fascinating to revisit informatics competencies and available technologies from the past 40 years plus. My first exposure to informatics competencies was a book (Anderson, Gremy, & Pages, 1974) published by the International Federation for Information Processing. This book also had three categories of learners: all health care professionals, professionals who work with data-processing experts, and professionals trained in computing and data processing. Understanding hardware and software, having the skills needed to operate a computer, and knowing the techniques/methods of using a computer for various health-related functions formed the basis of the generic competencies for all health care professionals.

The 1988 group built upon these generic competencies (Peterson & Gerdin-Jelger, 1988; see Table 1). Their focus for the practicing nurse was data processing, information seeking, and using documentation systems. Administrative competencies expanded to directing the organization of data for various purposes as well as communication and ethical standards. Researchers were focused on what I would call information literacy: data, text and graphical processing, and statistical analyses.

Teacher competencies were interesting and focused on computers for research, not practice. They remind me of a conversation I had when I visited a federal agency to discuss a proposal to teach nurses about computers. Essentially, I was told that nurses already knew about computers as they were taught SPSS for doing statistical analyses.

The United States had little adoption of informatics competencies until the 2000s. Two events influenced their recognition and development and were catalysts for nursing education to recognize that all nurses, students as well as practicing nurses, needed informatics knowledge and skills: the 2006 TIGER (Technology Informatics Guiding Education Reform) Summit and Quality Safety Education for Nurses (QSEN). These efforts garnered the attention of the NLN and other nursing education organizations to tackle the issues of competency.

One of the first informatics competency documents to surface was the American Association of Colleges of Nursing’s The Essentials of Baccalaureate Education for Professional Nursing (2008). Essential IV, Information Management and Application of Patient Care

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Technologies, has ambitious objectives for the nurse entering into practice. The document states that graduates need to:

- Advocate, recognize the importance of information technologies, and demonstrate skills in the use of patient care technologies and information systems, including clinical information systems and communication devices, to ensure safe and quality care and documentation.
- Apply safeguards, decision support tools, and ethical standards to support a safe practice environment.
- Understand how to use patient care technologies for diverse patient populations.
- Evaluate data to inform practice and use standardized terminologies to reflect nurses’ contributions to patient outcomes and nurse-sensitive outcomes.
- Recognize that workflow redesigns should occur before any new technologies are implemented and nurses should participate in the evaluation of information systems through policy and procedures development.

The recommendation that nurses use telecommunications for effective communication needs an update. I am sure digital natives have never heard of this word. But many of the recommendation, while needing updates to reflect new and evolving technologies, remain relevant.

**COMPETENCIES PROPOSED FOR THE FUTURE**

Working with the lists we brought to the postconference, our group (from Great Britain, New Zealand, Australia, the Netherlands, and Finland, as well as the United States) eventually arrived at 10 competencies updated to reflect current trends and technologies: digital health tools, remote care, interprofessional care teams, patient as partner, data extraction, monitoring of patient outcomes, and the development of evidence using clinically relevant data. We were fortunate to have access to a new document, eHealth Strategy of the Finnish Nurses Association 2015–2020 (in English at http://nurses-fi-bin.directo.fi/@Bin/b75b13c872e02bb9f9f2eb3a8a8bf5a0/1472841597/application/pdf/237208/eHealth_RAPORTTI%20ENGLANTI.pdf). Here is one example of the 10 competencies we generated: “Nurses need to respect the individual’s preferences in their use(s) of digital health application.”

The following competencies from the other groups relate to new frontiers such as big data, genomics, and ehealth.

- Have the proficiency to communicate appropriately, responsibly, and to evaluate conversations critically within the realm of socially based technologies (see www.edelmandigital.com/2010/04/01/do-media-literacy-digital-literacy-and-social-media-literacy-intersect/).
- Be able to interpret end-user data from multiple sources and apply these data to effective clinical decision-making.
- Understand types and sources of data captured by information systems, including data quality and type (e.g., structured data, free-text narratives) and the value and importance of big data to improve patient care.
- Use and access Pharmacogenomics Knowledge Bases (www.pharmgkb.org) and other data repositories.
- Understand the semantics of nursing data and the consequences of data definition ambiguities.

**EXPANDING THE CONVERSATION**

The proposed competencies provide an excellent foundation for discussion in nursing education. You may want to use the following questions to spark conversation:

- As technologies become more pervasive and ubiquitous (e.g., sensors, smartphone, tablets) and less like desktop computers, is there a need to focus on computer literacy knowledge and skills? Perhaps we might need to examine digital literacy knowledge and skills.
- Is information literacy still important? Do current knowledge and skills under information literacy address the areas of social media and mobile apps? Should this area be expanded or
What new communication knowledge and skills do practicing nurses need in an interprofessional, connected care ecosystem? Will nurses need different skills to communicate with an interprofessional team and to interact with patients, families, and caregivers via virtual visits, patient portals, social media, and even personal robotic assistants?

Will nurses learn how to maintain a sense of presence and caring in virtual patient visits and through various digital media?

Given the increased amount of data being collected by providers and patients, are data processing and information management still necessary knowledge and skills? Or do we need to also examine knowledge management, data analytics, and data visualization competencies?

What are the new legal, ethical, social, and public policy questions once we move beyond the era of electronic health records and into a connected care ecosystem?

As always, I welcome your comments and ideas; write to Diane. Skiba@ucdenver.edu. Also, look for our postconference book, Forecasting Informatics Competencies for Nurses in the Future of Connected Health, edited by Judy Murphy and William Goossen. Published by IOS Press toward the end of 2016, it will be an open-access publication.

REFERENCES