

Nursing Informatics Competencies for Practicing Nurses: A Self Assessment Initiative

Presenting Author: June Kaminski, RN MSN PhD(c) – CNIA President

Nursing Informatics, a term coined to describe the integration of nursing science with information and computer science, has developed into a mandatory focus for all registered nurses on a global scale. For the past four decades, literature, research and a growing body of practice have addressed the theoretical and practical aspects of informatics in nursing. A web-site was created to offer registered nurses a web-based, free, professional development initiative to support them to self-assess their nursing informatics competencies and learning needs. Various competency taxonomies have been reviewed and integrated in the process. Tutorials and other planning initiatives were also created to help nurses begin the process of self-directed education in informatics. The intention of this work is to give nurses a preliminary analysis of their current expertise and learning needs in the realm of informatics in nursing. This site is available at: <http://www.nursing-informatics.com/niassess/index.html>

A comprehensive list of technological, utility, and leadership competencies were defined and described for each of the three levels of User. Accompanying self-tests were provided to allow nurses to assess their own level of expertise in the list of competencies addressed. As well, tutorials were provided or linked to help nurses begin to address their own particular learning needs to develop the competencies that they wished to develop. Personal learning plan worksheets were also provided to assist nurses in articulating their own learning goals and plan to address their perceived needs.



Competencies

Over the past thirty or so years, various theorists, educators and groups have proposed essential competencies and literacy skills for nurses in practice, research, education and administration. Since the mid 1980's, some theorists have stressed the need for nursing informatic specialists, now known as informaticians or informatists. Specialists develop higher end technological skills and expertise and are most often employed as system coordinators, project managers, agency educators and analysts in all areas of nursing

practice.

"The need to adopt a culture in nursing that promotes acceptance and use of information technology has been identified as an important parallel initiative to establishing Nursing Informatics competencies and educational strategies" (Hebert, 1999, p. 6). Strategies for achieving NI competencies in the workplace include inservice training, intranet ready modules, access to online resources, and opportunities for continuing education. "Barriers to achieving NI competencies in the workplace include restricted access to training and training systems for nurses and nursing students, few leaders and educators with NI skills, and limited empirical support for the contributions ICT can or will realistically make to nursing and patient outcomes" (p. 6).

Most theorists also emphasize the need for every nurse whether employed in the practice or education setting, to develop a minimum of a "user" level in computer literacy and informatics theory. This site is most useful for the latter - to help individual nurses to assess their level of knowledge and know - how in the realm of nursing informatics. Resources for further education to work towards specialist status are also included in the "Resources" section of this site.

Several emerging taxonomies for describing nursing informatics competencies have been discussed in the literature. Most focus on a three tiered system which equate to a:

- a) beginner, entry or user level
- b) intermediate or modifier level and
- c) advanced or innovator level of competency.

With the advent of computer technology use in nursing, the need for data to be analysed and interpreted to become usable information in practice escalates with each passing year. In order to work with data, process information and derive knowledge nurses must be able to apply synthesis and application to their practice. Therefore informatics competencies need to be developed in all three levels of expertise through basic and continuing nursing education programs.

Each of the three competency levels includes both knowledge and skills required to:

- " use information and communication technologies to enter, retrieve and manipulate data;
- interpret and organize data into information to affect nursing practice; and
- combine information to contribute to knowledge development in nursing" (Hebert, 1999, p.6).

As well, competencies themselves are divided into various categories equivalent to the three used on this site: technical, utility and leadership competencies. Select competencies in each of these three areas are presented within the three levels of users described above.

LEVEL OF EXPERTISE

[Users](#)
[Modifiers](#)
[Innovators](#)

COMPETENCIES

[Technical](#)
[Utility](#)
[Leadership](#)

Technical Competencies

Technical competencies are related to the actual psychomotor use of computers and other technological equipment. Specific nursing informatics competencies include the ability to use selected applications in a comfortable and knowledgeable way. It is important that nurses feel confident in their use of computers and software in the practice setting, especially at the bedside, in order to be able to attend to the client at the same time.



COMPUTER APPLICATIONS

All three levels of competencies - users, modifiers and innovators need to develop a working knowledge of the following computer programs and processes:

1. Word processing
2. Keyboarding
3. Spreadsheets
4. Presentation Graphics
5. Databases (simple to complex)
6. Desktop Publishing
7. World Wide Web
8. E-mail programs
9. Expert data systems
10. Multimedia
11. Telecommunication devices
12. Nursing information systems
13. Hospital information systems
14. Peripherals (printers, CD-ROMS, DVD)



User level technical competencies include:

1. uses word processing applications
2. demonstrates keyboarding skills
3. uses spreadsheet applications
4. uses telecommunication devices to communicate with other systems
5. uses e-mail systems to communicate with other health care professionals
6. uses presentation applications to create slides, displays, overheads (PowerPoint, Corel Presentation, etc.)
7. uses multimedia presentations
8. uses internet resources to locate client support groups, online resources
9. uses sources of data that relate to nursing practice and care
10. accesses, enters and retrieves data related to client care via available hospital or nursing information systems
11. uses database management programs to develop and access databases and tables
12. uses database applications to enter and retrieve data and information
13. conducts online and database literature searches
14. uses decision support systems, expert systems and other aids for clinical decision making and care planning
15. uses computer applications to document client care
16. uses computer applications to plan client care, including discharge planning
17. uses computer applications to enter client data (demographic, vital signs,

- physiological data)
- 18.uses information management systems for client education
 - 19.uses technology based client monitoring systems
 - 20.operates peripheral devices (bedside and hand held)
 - 21.uses operating systems
 - 22.uses computer peripheral devices (CD ROMs, DVD, zip drives)
 - 23.uses computer technology safely
 - 24.navigates in Windows environment effectively
 - 25.demonstrates basic technology skills (load paper, change toner, unjam printers, print)

Modifier level technical competencies include:

1. applies technology support to provide evidenced based practice
2. synthesizes data from more than one source and applies to practice
3. demonstrates awareness of and ability to access data and information from multiple sources
4. uses decision support systems in practice
5. accesses pertinent literature resources and incorporates into practice and professional development
6. creates and accesses research and other documents electronically

Innovator level technical competencies include:

1. participates in the design and development of information systems for nursing practice
2. develops inventive ways to access data and interact with information systems
3. participates in the design and develop design and development of new applications for nursing practice
4. participates in developing new methods for data and information organization
5. collaborates with information technology consultants and other members of information system development team
6. collaborates, negotiates with and directs information technology vendors
7. proficiency in diverse computer application programs
8. manipulates and enhances nursing data sets
9. organizes and directs applications of shared data sets
- 10.develops data gathering tools and processes for literature search access for nurses
- 11.develop charting and documentation templates for use in nursing practice
- 12.design and development of evidenced based practice documentation and processing within practice area

Utility Competencies

Utility competencies are related to the process of using computers and other technological equipment within nursing practice, education, research and administration. Specific nursing informatics competencies include the process of applying evidenced based practice, critical thinking, and accountability in the use of selected applications in a comfortable and knowledgeable way.



User level utility competencies include:

1. recognizes the relevance of nursing data for improving practice
2. recognizes limitations of computer applications
3. recognizes need for continual learning in informatics skills, applications and knowledge
4. recognizes the nature of computer - human interfaces and assesses impact on client care
5. understands the basic process of using networks for electronic communication
6. recognizes the basic components of computer systems

Modifier level utility competencies include:

1. understands basic and complex concepts and processes of various computer systems and how they relate to practice
2. accesses and utilizes multiple information sources for gathering evidence for clinical decision making
3. upholds ethical standards related to data security, confidentiality and clients' right to privacy
4. evaluates internet based nursing and health materials for quality, accountability, reliability and validity
5. coordinate information flow with multidisciplinary team using information systems
6. analyzes patient information needs, accesses technology resources to meet needs and evaluate effectiveness

Innovator level utility competencies include:

1. participates in needs assessment, system selection, implementation and maintenance of information systems for practice
2. ensures inclusion of nursing data and information in design of planned information systems
3. recognizes factors and issues related to human - computer interface interactions
4. independently seeks learning initiatives to stay abreast of technological developments
5. synthesizes data and information for knowledge generation within practice
6. understands and helps to determine data structures used to organize patient information



Leadership Competencies

Leadership competencies are related to the ethical and management issues related to using computers and other technological equipment within nursing practice, education, research and administration. Specific nursing informatics competencies include the process of applying accountability, client privacy and confidentiality and quality assurance in

documentation in the use of selected applications in a comfortable and knowledgeable way.

User level leadership competencies include:

1. uses computerized management systems to record administrative data (billing data, quality assurance data, workload data, etc.)
2. uses applications for structured data entry (classification systems, acuity level, etc.)
3. understands client rights related to computerized information
4. recognizes the utility of nurse involvement in the planning, design, choice and implementation of information systems in the practice environment
5. incorporates a Code of Ethics in regards to client privacy and confidentiality

Modifier level leadership competencies include:

1. awareness of role of nursing informatics in the context of health informatics and information systems
2. participates in policy and procedural development related to nursing informatics
3. participates in system change processes and utility analysis
4. participates in evaluation of information systems in practice settings
5. analyzes ergonomic integrity of work station, bed side and portable technology apparatus in practice
6. participates in design of data collection tools for practice decision making and record keeping
7. participates in quality management initiatives related to patient and nursing data in practice
8. awareness of the impact of implementing technology to facilitate nursing practice
9. evaluates security effectiveness and parameters of system for protecting client information and ensuring confidentiality
10. participates in change to improve the use of informatics within nursing practice
11. encourages other nurses to develop comfort and competency in technology use in practice



Innovator level leadership competencies include:

1. develops and participates in quality assurance programs using information systems
2. participates in patient instructional program development
3. participates in ergonomic design of work stations, bed side access stations and portable apparatus equipment
4. awareness of societal and technological trends, issues and new developments and applies these to nursing
5. demonstrates proficient awareness of legal and ethical issues related to client data, information, confidentiality
6. design and implement project management initiatives related to information technology for practice

User Level Competencies

A "User" level of competency indicates nurses who demonstrate core nursing informatics competencies. This level includes practicing nurses, nursing administration, nurse researchers and educators. In most taxonomy, this is the basic level that **ALL** nurses should minimally demonstrate, no matter what area of practice he or she works in. Even user level competencies include technical, utility and leadership related skills and knowledge.

The competencies required by nurses in the workplace are categorized in a number of ways in the literature. Although different language is used to describe these competencies, the key concepts and categories are quite similar across taxonomies. All proposed frameworks include competencies that describe:

- the use of information and communication technology (*technical competencies*),
- the use of automated information in a professional context (*utility competencies*)
- decision-making with respect to planning for and using both the technology and information (*leadership competencies*).

TECHNICAL COMPETENCIES

User level technical competencies include:

1. uses word processing applications
2. demonstrates keyboarding skills
3. uses spreadsheet applications
4. uses telecommunication devices to communicate with other systems
5. uses e-mail systems to communicate with other health care professionals
6. uses presentation applications to create slides, displays, overheads (PowerPoint, Corel Presentation, etc.)
7. uses multimedia presentations
8. uses internet resources to locate client support groups, online resources
9. uses sources of data that relate to nursing practice and care
10. accesses, enters and retrieves data related to client care via available hospital or nursing information systems
11. uses database management programs to develop and access databases and tables
12. uses database applications to enter and retrieve data and information
13. conducts online and database literature searches
14. uses decision support systems, expert systems and other aids for clinical decision making and care planning
15. uses computer applications to document client care
16. uses computer applications to plan client care, including discharge planning
17. uses computer applications to enter client data (demographic, vital signs, physiological data)
18. uses information management systems for client education
19. uses technology based client monitoring systems
20. operates peripheral devices (bedside and hand held)
21. uses operating systems
22. uses computer peripheral devices (CD ROMs, DVD, zip drives)
23. uses computer technology safely
24. navigates in Windows environment effectively
25. demonstrates basic technology skills (load paper, change toner, unjam printers, print)

UTILITY COMPETENCIES

User level utility competencies include:

1. recognizes the relevance of nursing data for improving practice
2. recognizes limitations of computer applications
3. recognizes need for continual learning in informatics skills, applications and knowledge
4. recognizes the nature of computer - human interfaces and assesses impact on client care
5. understands the basic process of using networks for electronic communication
6. recognizes the basic components of computer systems

LEADERSHIP COMPETENCIES

User level leadership competencies include:

1. uses computerized management systems to record administrative data (billing data, quality assurance data, workload data, etc.)
2. uses applications for structured data entry (classification systems, acuity level, etc.)
3. understands client rights related to computerized information
4. recognizes the utility of nurse involvement in the planning, design, choice and implementation of information systems in the practice environment
5. incorporates a Code of Ethics in regards to client privacy and confidentiality

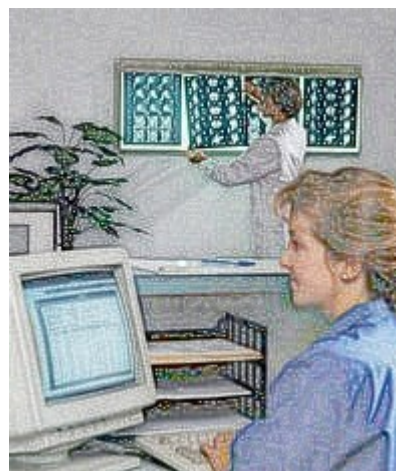
Modifier Level Competencies

A "Modifier" level of competency indicates nurses who demonstrate intermediate nursing informatics competencies. This level includes practicing nurses, nursing administration, nurse researchers and educators who have mastered basic skills and use technology in inventive ways in their practice.

TECHNICAL COMPETENCIES

Modifier level technical competencies include:

1. applies technology support to provide evidenced based practice
2. synthesizes data from more than one source and applies to practice
3. demonstrates awareness of and ability to access data and information from multiple sources
4. uses decision support systems in practice
5. accesses pertinent literature resources and incorporates into practice and professional development
6. creates and accesses research and other documents electronically



UTILITY COMPETENCIES

Modifier level utility competencies include:

1. understands basic and complex concepts and processes of various computer systems and how they relate to practice
2. accesses and utilizes multiple information sources for gathering evidence for clinical decision making
3. upholds ethical standards related to data security, confidentiality and clients' right to privacy
4. evaluates internet based nursing and health materials for quality, accountability, reliability and validity
5. coordinate information flow with multidisciplinary team using information systems
6. analyzes patient information needs, accesses technology resources to meet needs and evaluate effectiveness

LEADERSHIP COMPETENCIES

Modifier level leadership competencies include:

1. awareness of role of nursing informatics in the context of health informatics and information systems
2. participates in policy and procedural development related to nursing informatics
3. participates in system change processes and utility analysis
4. participates in evaluation of information systems in practice settings
5. analyzes ergonomic integrity of work station, bed side and portable technology apparatus in practice
6. participates in design of data collection tools for practice decision making and record keeping
7. participates in quality management initiatives related to patient and nursing data in practice
8. awareness of the impact of implementing technology to facilitate nursing practice
9. evaluates security effectiveness and parameters of system for protecting client information and ensuring confidentiality
10. participates in change to improve the use of informatics within nursing practice
11. encourages other nurses to develop comfort and competency in technology use in practice



Innovator Level Competencies

An "Innovator" level of competency indicates nurses who demonstrate advanced and specialized nursing informatics competencies. This level includes practicing nurses, nursing administration, nurse researchers and educators who have mastered expert skills and use technology in design, plan and coordinate the use of technologies and informatics theory in nursing.

TECHNICAL COMPETENCIES

Innovator level technical competencies include:

1. participates in the design and development of information systems for nursing practice
2. develops inventive ways to access data and interact with information systems
3. participates in the design and develop design and development of new applications for nursing practice
4. participates in developing new methods for data and information organization
5. collaborates with information technology consultants and other members of information system development team
6. collaborates, negotiates with and directs information technology vendors
7. proficiency in diverse computer application programs
8. manipulates and enhances nursing data sets
9. organizes and directs applications of shared data sets
10. develops data gathering tools and processes for literature search access for nurses
11. develop charting and documentation templates for use in nursing practice
12. design and development of evidenced based practice documentation and processing within practice area

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Innovator level utility competencies include:

1. participates in needs assessment, system selection, implementation and maintenance of information systems for practice
2. ensures inclusion of nursing data and information in design of planned information systems
3. recognizes factors and issues related to human - computer interface interactions
4. independently seeks learning initiatives to stay abreast of technological developments
5. synthesizes data and information for knowledge generation within practice
6. understands and helps to determine data structures used to organize patient information

LEADERSHIP COMPETENCIES

Innovator level leadership competencies include:

1. develops and participates in quality assurance programs using information systems
2. participates in patient instructional program development
3. participates in ergonomic design of work stations, bed side access stations and portable apparatus equipment
4. awareness of societal and technological trends, issues and new developments and applies these to nursing
5. demonstrates proficient awareness of legal and ethical issues related to client data, information, confidentiality
6. design and implement project management initiatives related to information technology for practice

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BIOGRAPHY:

June is completing her PhD at the University of BC in Technology Education, Curriculum Studies. Her focus is educational technology, informatics, aesthetics and e-learning for nursing. Currently, she is presently completing her PhD dissertation work on the faculty perceptions of nursing informatics and education culture. June is currently the President-Elect and Director of Communications for the Canadian Nursing Informatics Association (CNIA). She assumes the President role in 2008. She is also the Editor in Charge of Virtual Nursing Practice and Culture for the Online Journal of Nursing Informatics (OJNI) and a member of the OJNI Board of Directors. As well, she is the Editor in Charge of the Canadian Nursing Informatics Journal She has taught Nursing Informatics related theory and practice content to nursing students and nurses since 1990 at Kwantlen University College in Surrey, BC and presents education and other nursing informatics related information through her website Nursing Informatics.com at

<http://nursing-informatics.com>