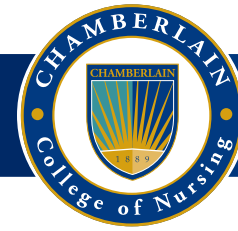# ASSESSMENT OF LEVEL 3 AND LEVEL 4 NURSING INFORMATICS (NI) COMPETENCIES TOOL DEVELOPMENT

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Objectives

• Differentiate between the NI competency data subsets

• Describe the NI self-assessment tool development process

• Explore applications for level 3 and level 4 NI competencies self-assessment tool

Problem

Nurses specializing in NI must be able to demonstrate NI competencies commensurate with their education and experience. Valid and reliable instruments for assessing individual competencies related to NI are lacking.

Specific Aim

To develop a reliable and valid instrument for self-assessment of perceived level 3 informatics specialist and level 4 informatics innovator competencies in selected informatics activities.

Background

Even though nursing informatics (NI) has been recognized as a specialty for decades, nursing education does not always address informatics competencies. Many nurses are not prepared to adequately use health information technology (HIT). As the demand for informatics competencies in nursing increases, we must be able to prepare not only nurses as basic users of HIT, but also informatics nurse specialists (INS) to innovate and lead the evolution of NI. In the clinical setting it is imperative to have an innovative leader in NI to inform nursing practice, enhance patient care and advance the nursing profession.
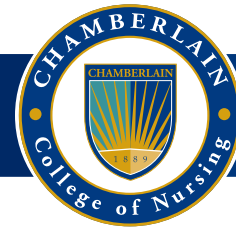
Methods

Instrument development began with a synthesis of both seminal and current literature. An initial review of the instrument by the researchers initiated instrument testing and a Delphi approach using two rounds of surveys with NI experts. The Delphi resulted in the identification and corroboration of level 3 and level 4 NI competencies for INSs that deal with computer skills, informatics knowledge and informatics skills.

The experts were asked to read every competency under each key dimension. Reflect on the competency and determine how relevant it is to assess the informatics specialist's and informatics innovator's ability to exhibit the behavior or perform the skill. They then rated each competency on a scale from 1 to 4 by deciding if it is 1) not relevant and should be removed; or 2) somewhat relevant/maybe keep it; or 3) quite relevant or keep; or 4) highly relevant or definitely keep it. For content validity for each section, see table below.

Section	Round 1	Round 2
Computer Skills	1.0	1.0
Informatics Knowledge	0.9	0.9
Informatics Skills	1.0	1.0
S-CVI/Ave	0.98	0.98

After the first round of the Delphi, it was determined that all of the items had merit but the experts felt that some items were missing. For round two, we added three items to the computer skills section, 16 items to the informatics knowledge section including one new subset, data mining and four items to the informatics skills section. For a list of the changes, see the following page.

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Methods (continued)

Computer Skills

System subset:

- Support research efforts through the use of specific types of software (for example, statistical or qualitative data management software)

- Determine the impact of computerized information management on manager and executive roles through program evaluation

- Utilize pattern recognition technologies for mathematical analysis

Informatics Knowledge

Data subset:

- Teach nurses to find, retrieve and evaluate information

Education subset:

- Assist with and support others engaging in social media (Facebook, Twitter, etc.) to benefit the patient

Impact subset:

- Participate with and adhere to IRB regulations for patient safety

- Assist in developing clinical practice environments that support the knowledge work of nurses

- Assess clinical workflow

- Support and maintain clinical workflow

Privacy/Security subset:

- Participate with and adhere to IRB regulations for data/IT security

Regulations subset:

- Support adhering to ADA technology accessibility guidelines

Usability subset:

- Use cognitive science principles and artificial intelligence theories to participate in the design of technology appropriate to the cognitive abilities of the user

- Develop algorithms for clinical decision support in nursing practice

Data Mining subset was added:

- Utilize Data Mining to predict future uses and trends

- Provide value in foreseeing future trends with data mining

- Utilize Data Mining to describe patterns within a data set

- Utilize statistics to provide complete analysis patterns within a data set

- Utilize Data Mining to provide informed decision making

- Utilize Data Mining to provide quality data metrics for proposed practice change

Informatics Skills

Analysis subset:

- Understands and can retrieve information using Data Mining

Design and Development subset:

- Analyze the system in use through internal environment scanning

Fiscal Management subset:

- Conduct return on investment (ROI) analysis regarding IT systems

Role subset:

- Consult with clinical, managerial, educational and or research entities

The level 3 and level 4 NI competencies online self-assessment instrument was converted to the format of a Qualtrix online survey with four parts: demographics and 178 items covering three sections: computer skills, informatics knowledge and informatics skills. Each section item had four rankings: beginner or N/A, comfortable, proficient or expert. The beginner / N/A category reflected that the respondent was unaware of or had limited knowledge and/or skills. The comfortable ranking related to easy association with the information, knowledge or skill necessary to be able to function with ease and able to use their judgment to problem solve, infer and interpret.

At the proficient rank, the respondent is informatics competent, well-advanced, and fluent in their ability to bilingually address nursing and IT; able to analyze and synthesize data, information and knowledge into wisdom to inter-professionally guide other healthcare team members. The expert ranking reflected extraordinary or exceptional proficiency that progresses the data, information, knowledge, and wisdom pathway to intuition; the breadth of their experience provides the ability to assess the context of each situation intuitively and respond and perform appropriately.

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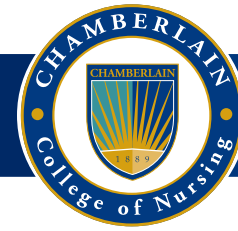
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Data Analysis:

This instrument was then piloted following IRB approval using a purposeful, convenience sample from the NI community participating in the ANIA-CARING listserve, Healthcare Information and Management Systems Society (HIMSS) and the Information and Technology Expert Panel of the American Academy of Nursing. Purposeful, convenience sample of 88 participants who completed the three level 3 and level 4 sections; the number of respondents answering an individual item varies, therefore, the number for each item may not total 88. The percentages for each item are calculated based on the item respondents.

The demographic section was completed by 100 respondents unless noted. This section consisted of the following:

- Age
- Gender
- Highest education preparation
- Length of practice in informatics
- Board certification in nursing informatics
- Other certification in informatics

The mean age range was 46-55 with an age range of 26-70. There were 12 males and 87 females. The highest education preparation responses were as follows:

- Diploma: 1
- Associate in Nursing: 4
- Bachelor in Nursing: 20
- Other baccalaureate: 3
- Master in Nursing: 50
- Other Master Degree: 13
- PhD: 9

The average length of practice in informatics was seven years. Additionally, 37 of these respondents were board certified in Nursing Informatics while 15 held other certifications in informatics.

Responses

The responses from the three sections, computer skills, informatics knowledge and informatics skills were analyzed.

The computer skills section consisted of 13 items across three subsets: computer skills, systems and quality improvement. The highest expert score of 21.4 percent was on item, determine aspects of nursing-informatics practice important for quality monitoring. The lowest expert score of 1.9 percent ranked item write macros or shortcuts for spreadsheets. The highest proficient score was 46.6 percent for item, develop or modify spreadsheets used for complex problems. One of the lower proficiency scores, 10.7 percent, occurred for item, utilize pattern recognition technologies for mathematical analysis.

The informatics knowledge section consisted of 56 items across eight subsets: data, education, impact, privacy/security, regulations, systems, usability and data mining. The highest expert score of 46.6 percent was on item, serve as an informational resource person for applications and systems. The lowest expert score of 7.8 percent was on item, utilize data mining to predict future uses and trends. The highest proficient score of 34 percent was on item, determine the limitations and reliability of computerized patient-monitoring systems. One of the lowest proficient expert score of 12.6 percent was on item, integrate nursing taxonomies, unified nomenclatures and other data needed by nurses within database design.

The informatics skills section consisted of 109 items across 13 subsets: analysis, data/data structures, design/development, fiscal management, implementation, management, programming, requirements, role, systems maintenance, system selection, testing and training. The highest expert score of 39.8 expert was on item, collaborate with nursing personnel and interdisciplinary teams to accomplish information-management work. The lowest expert score of 2.9 expert was on item, differentiate between machine and high-level programming languages. One of the highest proficient scores of 28.2 was on item, consult with clinical, managerial, educational, and/or research entities about informatics. One of the lower proficient scores of 19.4 was on this item, apply ergonomics principles in the selection and use of information-management technologies.

The participants were also given the opportunity to respond to a series of items concerning the survey listed below:

The overall length of the survey:

- 67% fine or OK
- 33% was long

The design of the survey:

- 59 percent easy to use, easy to follow, efficient
- 10 percent stated that there were format issues such as readability and spacing as well as issues with the terms for ranking competence such as beginner, comfortable and proficient
- 2 percent believed that the sections were not clear and add qualitative component, font not crisp, and prefer to click rather than scroll
- The remainder did not comment on the design

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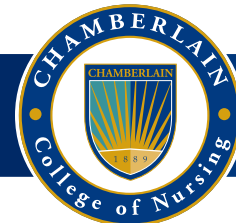
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Data Analysis (continued):

There were no comments for the following three sections:

• Wording of the competency questions
• Items needing to be removed
• Items needing to be added

Internal Consistency Reliability

Category	Cronbach's Alpha	Number of Items
Computer Skills	0.909	13
Informatics Knowledge	0.982	56
Informatics Skills	0.992	109

The Cronbach's Alpha is a conservative estimate. Based on this measurement, the computer skills section is 90 percent reliable, informatics knowledge section is 98 percent reliable and informatics skills section is 99 percent reliable. Therefore, the overall instrument is reliable.

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Conclusions:

Initial data from the pilot test supports that the level 3 and level 4 NI competencies online self-assessment tool is a reliable assessment of the level of knowledge or skill for each competency indicator described. Preliminary data analysis revealed that the tool can differentiate among the various levels of competencies. Using this tool will help prioritize learning time to focus on those areas that are most important to the respondent's situational context and concentrate on areas where the need for training and learning may be greatest.

The outcomes from this study can facilitate educators in developing curricula for building level 3 and level 4 NI competencies. It is extremely important that our practicing nurses and graduate student nurses are able to self-assess their NI competencies and address gaps in their knowledge and skills in order to plan initiatives and learning opportunities to improve their competence and subsequently enhance the evolution of NI. This in turn, can impact patient care at the bedside and beyond; improving the quality and safety of patient care worldwide.

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Assesment L# L4 NI Competencies - Hunter - July 2013 - Poster

Date 06/11/13	**Printed At** 100%	**Agency** PF
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Legal Line	❏	❏
SCHEV	❏	❏
INDI Code	❏	❏
NRW URL	❏	❏
Chamberlain URL	❏	❏
Chamberlain Address	❏	❏
Chamberlain Phone	❏	❏
Inventory Code	❏	❏
Production Code	❏	❏
3-Year BSN Copy	❏	❏
Other:	❏	❏

Job info

Element	Handout	**Pages**	4 pg
Live	8.5" x 11"	**Folded Size**	
Trim	8.5" x 11"	**VDP**	❏
Bleed	8.75" x 11.25"	**Notes**	

Approvals

	APPROVED	APPROVED W/ CHANGES	DENIED	DATE	INITIALS
Stephanie Gallo	❏	❏	❏		
	❏	❏	❏		
	❏	❏	❏		
	❏	❏	❏		
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