

2017

Nursing Informatics Competency Program

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Walden University

College of Health Sciences

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Kristina Dunn

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Walden University

2017

Abstract
Nursing Informatics Competency Program
by
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MS, Walden University, 2009

BS, University of NH, 1999

Project Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Nursing Practice

Walden University

August 2017

Abstract

Currently, C Hospital lacks a standardized nursing informatics competency program to validate nurses' skills and knowledge in using electronic medical records (EMRs). At the study locale, the organization is about to embark on the implementation of a more comprehensive EMR system. All departments will be required to use the new EMR, unlike the current policy that allows some areas to still document on paper. The Institute of Medicine, National League of Nursing, and American Association of Colleges of Nursing support and recommend that information technology be an essential core competency for nurses. Evidence of the need for nursing informatics competencies was found through a literature search using CINAHL, Proquest Nursing, Medline, and Pubmed search lines. Concepts searched were *competencies, nursing informatics, health information technology, electronic health record, information technology literacy, nursing education, information technology training, and curriculum*. The Stagers Nursing Computer Experience Questionnaire was distributed to 300 nurses practicing within the hospital setting to obtain baseline data on current nursing computer knowledge and skill level. This validated tool was created by Nancy Stagers in 1994 and used in other process improvement efforts similar to this one. The assumption was that nursing competency levels with computers were varied through the hospital. Data was obtained from the questionnaire, through Zoho Survey tool, confirmed this assumption and were used to help create the education, support, and competency plan for the future. Data was analyzed through the built-in reports and interactive charts that the Zoho survey tool provides.

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Section 1: Nature of the Project

This quantitative study utilized the Staggers Nurses Computer Experience questionnaire to assess the baseline information technology skills of the nurses working at C Hospital System. It was originally created by N. Staggers in 1994 to measure nurses past and present computer experience and was then updated in 1998 (Staggers, 1994). The tool has been validated and used in at least four other studies. Although it is an older tool, it provides information pertinent to the project, baseline data regarding current nurse self-assessments of computer knowledge and skills. The information collected will be used in the creation of the nursing informatics level I competency. If most nurses already have good baseline competency in simple computer use and knowledge, then these components may be left out of the level one informatics competencies. This survey will guide some of the content of the competencies.

Information from the survey was analyzed to provide knowledge regarding skills needed by those nurses considered novice or who have little to no healthcare computer literacy aptitude. Understanding these needs will benefit those at the competent level to serve as educators and mentors to those at the novice or advanced beginner level. Panno (1992) describes a systematic approach for assessment of the learning needs of staff nurses and the organizations in which they practice: (1) defining the target population, (2) analyzing learner and organizational needs, (3) analyzing the perceived needs of the learner and comparing them to actual needs, and (4) utilizing data to prioritize identified learning needs. Often plans for educational needs are based on personal preferences or

mandates from administration that may meet the sponsor's needs but not necessarily address the needs of learners.

Relevance to Practice

In 1992, the American Nurses Association (ANA) designated nursing informatics (NI) as its own specialty (ANA, 2015; Harrington, 2015). Nurses have an impact on human health, which is why they need to be prepared to provide the highest quality of patient care. Specific nursing competencies help identify that the nurse has the knowledge, skill, and training to carry out safe and reliable care to patients (Numminen, Meretoja, Isoaho & Leino-Kilpi, 2013). Since technology plays such an intricate role in healthcare, nurses need to have the training in that technology and be competent in operating it. If used appropriately, that technology may either involve contact with the patient or provide guidance to how to care for that patient.

While technology benefits health care in providing legibility to provider orders through computerized order entry, improving medication administration process to decrease medication errors, and allowing for patient access to their own health records, enabling them to be the drivers of their own healthcare, it also has some drawbacks: security and privacy remain concerns, technology can be costly to implement and maintain, there may be changes to staff workflows that may not be optimal due to meaningful use demands, and interoperability may provide a barrier to access other records as a result of lack of interchanging information due to no standard language. Nonetheless, healthcare technology benefits outweigh the risks, and it has enhanced the

capability of organizations nationwide to provide high quality patient care (King, Patel, Jamoom & Furukawa, 2014; Hoover, 2016; Menachemi & Collum, 2011).

Stakeholders of this project include nurse educators, informatics nurses, IT educators, patients, nursing leadership, and the healthcare organization. Nurses competent in using the healthcare technology may provide patients with evidence-based quality care. The nurse educators will have a standard tool they can use to ensure their nurses are competent in using the health information system. Nursing leadership may see a decrease in medical errors if the nurses know how to use the health information technology (HIT) system to its full potential. IT educators and nurse informaticists have a program that can continuously develop and educate nurses on the ever-evolving healthcare technology that the healthcare organization will need to engage. When the organization can meet quality care metrics, the result may be economic success.

Project Questions

PQ1: What are the specific learning needs of the staff nurses at XYZ Hospital related to basic informatics competency?

RQ2: How can this information be used to design a basic nursing informatics competency education program?

Evidence-Based Significance of the Project

The IOWA model is the evidence-based theory that provides the framework for the implementation of nursing informatics competencies. This model allows staff to focus on the knowledge and problem triggers, facilitating the process of looking for research on

the problem that will improve it. There are seven steps to the model (Doody, C. & Doody, O., 2011). See figure 1.

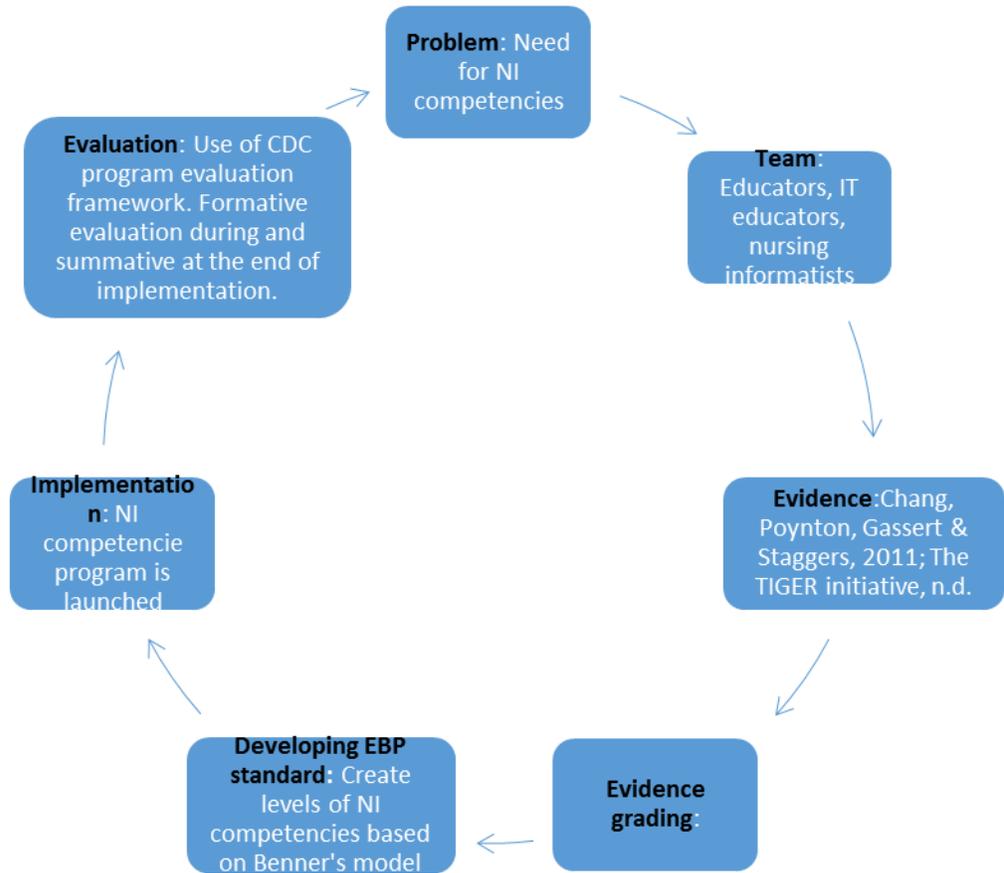


Figure 1. The steps of the project using the IOWA mode

Standardized job specific informatics competencies in nursing practice should become the norm. Targeted skills training should be provided to nurses upon hire in order for them to obtain the necessary competency for their positions (Chung & Stagers, 2014). Nurses who lack the competence to use the clinical information system (CIS) impede the success of the system. Competency aids in the nurse's ability to deliver quality care. Thus, if nurses make up the largest part of the healthcare system, their competency in technology use effects the organizational outcomes. Higher nursing informatics competencies leads to better organizational performance outcomes. With the use of the CIS, nurses make care decisions based on information supplied by these systems. Lin, Hsu & Yang (2014), conducted a study looking at the impact of computer system success and nursing informatics competencies on nursing organizational impact. A validated and reliable survey was taken by 454 nurses through hospitals in Taiwan. The results showed that improvements in informatics competence had more organizational impact than only providing a highly effective CIS. The success of a highly effective CIS to the organization depends on the competency level of the nursing workforce.

Implications for Social Change in Practice

Technology is integral to the healthcare environment, and nurses make up the largest number of professionals in healthcare. Literature shows that technology and informatics are improving quality of care and reducing errors in practice. Informatics is leading nurses to evidence-based practice. There is reduction in medication errors due to computerized order entry (CPOE), barcoding medications, and patient identification

bands (Radley et al., 2013; Gann, 2015). Nursing college curricula and healthcare organizations are integrating nursing informatics and technology education and competence into their programs and trainings in order for nurses to have the skills and knowledge to use the technology optimally.

Definitions of Terms

The following terms are relevant to the program:

Competency: The ability to demonstrate knowledge, attitude, and skill of a specific task that is measurable and evaluated against set expectations (Chung & Stagers, 2014)

Nursing informatics: An “integration of nursing science, computer and information science, and cognitive science to manage, communicate, and expand the data, information, knowledge, and wisdom of nursing practice” (Chung & Stagers, 2014, p. 597).

Nursing informatics competency: The demonstration of knowledge, attitude, and skill of nursing practice integrated with computer and cognitive science that manages, processes, and collects patient data (Chung & Stagers, 2014).

Assumptions and Limitations

I assumed that nurses will be honest in answering the questionnaire. I assumed based on literature and past experiences with nursing competencies that implementation of an NI competency program will increase the confidence in nurses’ use of the HIT system and achieve a higher level of competence (Smith, 2012). This study is limited to one health organization and may not be generalizable to other healthcare settings.

Summary

The widespread expansion of information technology and electronic health records calls for updated technology knowledge and skills for nursing. Since HIT has become so important in the healthcare industry today, it is essential that nurses have informatics competencies to enhance the skills and knowledge level in this area of practice, as they would with any nursing practice. It is important that these competencies are reliable and relevant to their practice and the HIT system in use (Yoon, Shaffer, & Bakken, 2015). Section two will discuss the concepts, models, and theories behind this study and describe the relevance to nursing practice.

Section 2: Background and Context

Introduction

Nurses are required to be skilled in the areas of their practice. Technology and informatics systems are being highly integrated into many organizations that have not previously had technology or informatics incorporated into their patient care. The new systems are requiring a new and more organized approach to nursing education and competency verification.

Practice Problem

C Hospital is an urban charitable organization that is located in Northeast United States. It exists to meet the health needs of individuals within the community. There are presently over 380 registered nurses (RNs) providing care in the 295-bed acute care facility. Currently, there are various levels of competence in health information technology among the nursing staff, and there is no formal nursing informatics training program. No standardized educational or competency process exists to enhance nurses' IT knowledge and skills in their respective specialty areas. When staff trains for new programs or enhancements, no standard process exists to ensure they are competent in using the new application or process. Nurses initially learn the minimal basics on the HIT system in orientation, and then the preceptor teaches them more about the system. However, the instruction extends only as far as the preceptor's competence. The training of a new HIT system will be standard for all nurses, and the NI competency program will enhance their skills and knowledge to optimize use of the system and contribute to the

success of the implementation. The NI competencies will be used for all future new nurses who enter the organization.

Purpose Statement

The purpose of this project was to identify gaps in basic HIT knowledge by conducting a system-wide nursing informatics self-assessment. This information will be utilized to develop the first phase of a nursing informatics competency program that will enhance the competency of the nursing workforce in use of the HIT. Implementing an NI competency program in an acute care setting where a new HIT system is being implemented may assist in developing the nurses' knowledge and skills. Appropriate use of the HIT systems will enhance the nurse's ability to deliver evidence-based quality patient care.

Project Questions

PQ1: What are the specific learning needs of the staff nurses at C Hospital related to basic informatics competency?

PQ2: How can this information be used to design a basic nursing informatics competency education program?

Specific Literature

A literature search was conducted using CINAHL, Proquest Nursing, Medline, and Pubmed search engines. The following concepts were searched: *competency, nursing informatics, health information technology, electronic health records, information technology literacy, nursing education, information technology training and curriculum.*

The Technology Informatics Guiding Education Reform Initiative (TIGER) was formed in 2004 to develop a vision and specific strategies on improving nursing practice through use of health IT. Over 70 organizations and 100 nurse leaders attended the Tiger Project summit in 2004. The organization's focus is to help nursing adopt informatics tools and practices to deliver high quality care (TIGER, nd). In phase II, the TIGER initiative included a report on competencies for already practicing nurses. These competencies included basic computer skills, information literacy, and information management (McCartney, 2011; TIGER, n.d.). Staggers, Gassert, & Curran (2001), developed a panel of expert researchers to define and clarify nursing informatics (NI) competencies based off of a review of past literature from 1986-1998. The panel extracted (NI) competencies from a previous thirty-five studies. By developing schemes and categorizing them they were able to decrease the number of competencies from over 1500 to 303. It was then decided that nursing levels should be integrated into the competencies. The expert panel members rated the competencies and they eventually came up with three basic categories, computer skills, informatics knowledge, and informatics skills, and four levels of NI competencies. The four levels were: 1) beginning nurses 2) experienced nurses 3) informatics specialists and 4) informatics innovator.

I found a few studies that used the four levels of competencies developed by Staggers, Gassert, & Curran (2001). Hwang & Park (2011), conducted a descriptive study where 350 nurses in two teaching hospitals in Korea were given a questionnaire survey on their NI competency levels. These hospitals had electronic health records. The competency questions were grouped into basic computer skills, attitudes towards

computerization, informatics knowledge, and informatics skills. The researchers found that nurses younger than 40 years who had formal informatics education with less than 10 years of experience had greater informatics competency than the other nurses. Two thirds of all the nurses felt they didn't have sufficient informatics competency. Chang, Poynton, Gassert, and Stagers (2011) created NI competencies for nurses in Taiwan by developing a panel of expert nurse educators and administrators. They were surveyed on the existing competencies previously developed by Stagers, Gassert & Curran (2001) to indicate the importance of each using the Delphi procedure. They came up with 40 new NI competencies that reflected on technology changes and newer technology. Again, the categories were computer skills, informatics knowledge, and skills.

Schleyer, Burch & Schoessler (2011), described one hospital's experience with implementing an NI competency program that occurred over a three-year period using Benner's model for level of nursing competency. Benner is a nursing theorist who developed a model for stages of clinical competence from novice to expert. Benner recognized that nurses develop skills and knowledge over time through education and experience. The level of competence depends on how much experience and education that nurses have received (Benner, 1994). In this study, each level was defined by specific NI competencies that the nurse had to meet to move to the next level. After initial training on the electronic healthcare record (EHR), nurses were given NI competencies at 6 months and 1 year. The NI competencies were used for professional development in NI to the expert level. The hospital developed infrastructural support for

the program that included not only the levels of competency, but also an enhanced training program and post IT support.

Chung & Staggers (2014) conducted a study to measure NI competencies in practicing nurses of Korea using the NI competencies developed by Staggers, Gassert & Curran (2001). The purpose was to develop an instrument to measure informatics competencies from beginning level and experienced level. Over 228 nurses were given a questionnaire survey that covered basic computer skills, informatics knowledge, and informatics skills. The organizations the nurses worked for had had an EHR for over 10 years. It was found that nurses with previous informatics education and those with managerial responsibilities had higher competency scores. Those who had computers at home had higher computer skills; however, they didn't have higher informatics competencies.

Conceptual Models and Theoretical Frameworks

The data, information, knowledge, wisdom (DIKW) model provides a foundation for the development of nursing informatics competencies.

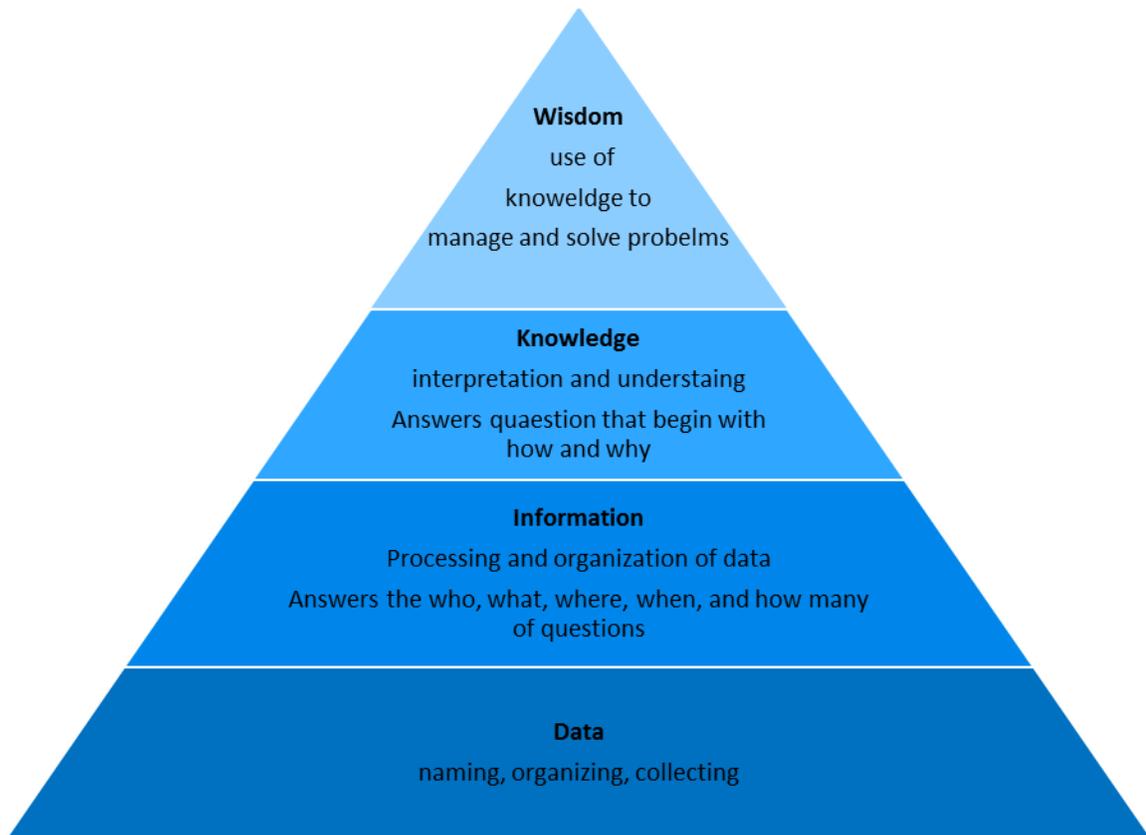


Figure 2. The hierarchy of the concepts in the DIKW model.

The use of the DIKW model in conjunction with Benner's model of novice to expert provides a foundation for the NI competencies in developing nurses' knowledge and skills in informatics.

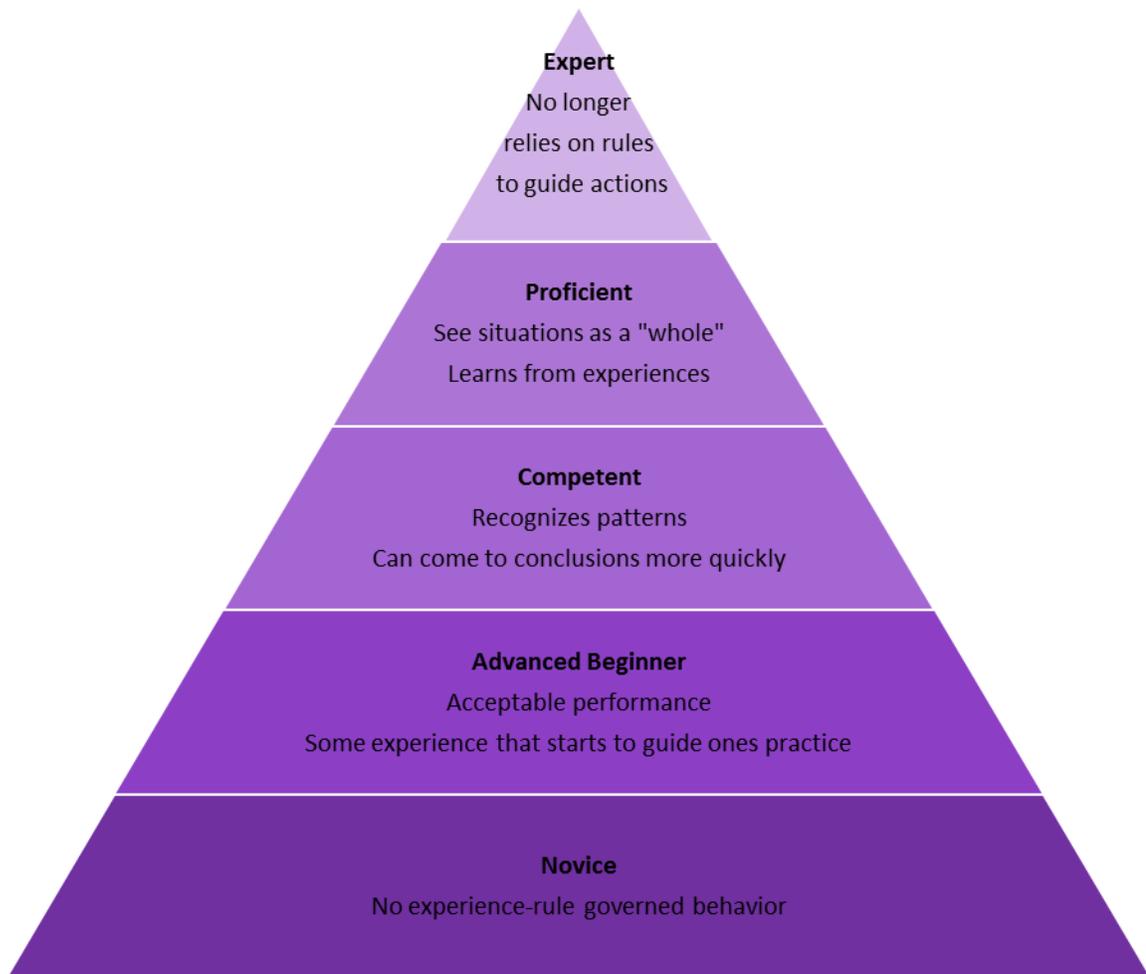


Figure 3. Benner's model in hierarchy form

Role of the DNP Student and Doctoral Competency to be Addressed

The healthcare environment is becoming more complex. This requires the highest level of practice expertise to provide the best patient outcomes. The DNP student is prepared to lead at the highest level of practice (Sperhac & Clinton, 2008). The American Association of Colleges of Nursing (AACN; 2006) developed the DNP essentials. This project addresses the DNP essential of the use of technological information systems to improve and transform healthcare. Inter-professional collaboration is addressed as well due to working with the different departments and leaders that this project includes. There is a need to be able to work professionally with other disciplines through effective communication and conflict resolution skills. The leadership and management essential is addressed because I learned leadership skills in planning the project.

Role of the Project Team

The project team consists of the IT educators, NI nurses and nurse educators. Their role is to be engaged and contribute at all levels of the project. The nurse educators will help more with the logistics of how to develop and implement the education program, and the informatics nurses can help with the development of the competency levels. The project agent will perform a presentation to the team on the purpose and evidence supporting the project. The team will be involved with process improvements based on observations and data collected through the questionnaires. The first phase of competencies will be shared with the team about two months prior to them being implemented. This will allow some time for the team to provide any feedback for improvements. Once the first phase has been implemented, the project agent will set a

meeting with the team about a month after to evaluate if nurses can pass the first phase of competencies. This will help determine if they are too easy, too complex, or at an appropriate level for the nurses. The team can decide how to improve them if needed.

Summary

Competence development and maintenance can be very challenging in the nursing profession. However, nurses care for millions of people, whether because the person is ill or for prevention care. They are trusted by society to be professional, competent healthcare workers. Nurses are required to demonstrate skill and knowledge in a given situation. If the knowledge and skill have an impact on patient care, then the nurse needs to demonstrate competence (Smith, 2012). Technology and informatics is integrated into their responsibilities in caring for patients, so they require competence in their use.

Section 3: Collection and Analysis of Evidence

Introduction

There are steps in developing and implementing a program that need to be followed in order for it to be successfully administered. Needs assessment and problem identification, planning, designing, and tracking the intervention, and impact program evaluation are all required. This section will discuss the needs assessment process and the plan for using this information to design a nursing informatics competency program. (Kettner, Moroney & Martin, 2013).

Practice Problem

C Hospital is an urban charitable organization that is located in Northeast United States whose mission is to meet the health needs of individuals within the community. There are over 380 RNs providing care in the 295-bed, acute care facility. Currently, there are various levels of competence in health information technology among the nursing staff, and there is no formal nursing informatics training program. No standardized educational or competency process exists to enhance the nurses' IT knowledge and skills in their respective specialty areas. When new IT programs or enhancements are implemented with the nursing staff, no standard process exists to ensure they are competent in using the new application or process. Nurses initially learn the minimal basics on the HIT system in orientation, and then the unit-based nurse preceptor teaches them more about the system.

Purpose Statement

The purpose of this project was to conduct a system-wide nursing technology assessment and then utilize this information to develop the first phase of an information technology competency program for nurses that will enhance the competency of the nursing workforce in use of the HIT. Implementing an IT competency program in an acute care setting where a new HIT system is being implemented will develop the nurses' knowledge and skills from novice to expert. This will enhance the nurses' ability to deliver evidence-based quality patient care.

Project Questions

PQ1; What are the specific learning needs of the staff nurses at C Hospital related to basic informatics competency?

PQ2: How can this information be used to design a basic nursing informatics competency education program?

Project Design Methods

This project will address phase I of the program development and the plan for implementation of phase II of new NI competencies and education.

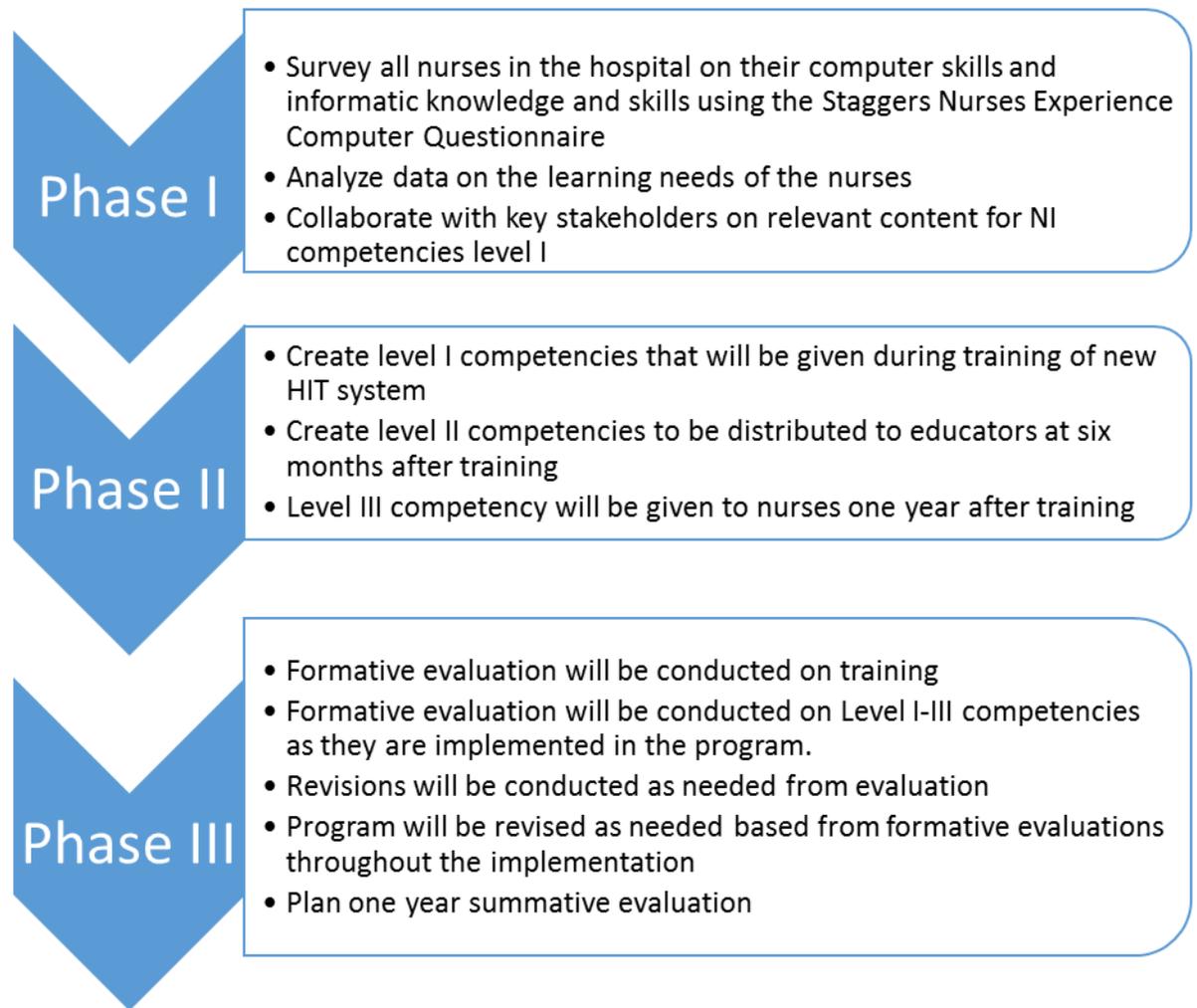


Figure 4. Program design: How the program is created and implemented (Kettner, Moroney & Martin, 2008).

The survey provided data on current nurse computer use, knowledge, and skill level. The data was analyzed and will be used to create appropriate first level NI competencies. Conducting a needs assessment gave a good summation and broad view of the problem. It helped identify the education gap in nursing knowledge of computers in healthcare (Hodges & Videto, 2011). According to Panno (1992), a needs assessment analyzes the learner and the organizational learning needs. The data of perceived education needs are analyzed and compared to actual education needs.

Population and Sampling

The survey was distributed to all staff nurses that currently work in the hospital setting via e-mail link. The goal was to have at least a 15% response rate. An inadequate sample size can reduce the quality of the data retrieved. The more participants the richer the data is that can be used (Grove, Burns & Gray, 2013).

Data Collection

Data was collected through Zoho survey tool distributed to all nurses that were employed at the hospital at the time of distribution. The Stagers Nursing Computer Experience Questionnaire is a small questionnaire on computer skills, knowledge, and use. This tool's reliability has been tested through several studies. It has a reliability range of .86-.95 and was last revised in 1998. The last reliability testing was conducted in 1999 with Cronbach's alpha score of .89 (N.S. Stagers, personal communication, July 25, 2016; see Appendix A).

This process was reviewed with the hospital's Institution Review Board (IRB) who wanted to know the purpose, risks, and benefits to the participants as well as the

procedures. The target population knew that their participation in the survey was voluntary. The message included a cover letter explaining the survey and that completing it constitutes consent. (Hodges & Videto, 2011). It also explained that there would not be any identifying data and it was completely voluntary but beneficial to the nurses for future training and NI competence with the new system.

Data Analysis

The Zoho Survey tool provided real time data as it came in. It had the ability to filter and cross tab data and create bar graphs and charts. The survey process did not track where the information was coming from, which ensured the participants' confidentiality (Zoho Survey, 2017). Demographics were collected including age range, years of practice, and current nursing department. Gathering demographic data describes the sample and can be considered for generalization of findings (Grove et al., 2013). The data is being used for needs assessments in development of the first level of NI competencies. There may be certain departments that have a lower level of current computer knowledge and skill. These areas may need basic computer knowledge skills in the level one competency.

Data collected on computer knowledge and application will provide the project with a baseline of where nurses are in their confidence of computer use. The data can be cross-tabulated with the departments they work in and education level. This will identify where the need for more training will be initially. The reason for computer use will provide how nurses value computer use. If the value of computer use is low, then there may need to be more education on benefits incorporated into the competencies. The same

survey will be distributed one year after the project has been implemented; however, that will be beyond the timeline of this DNP project. The assumption is that there will be greater competent scores compared to the first survey.

The broken-down data will tell which departments are more confident in using computers than others and their experience with them. Several departments have continued to document on paper even though most inpatient departments have been documenting electronically for over seventeen years. The needs assessment data will be shared with the department leadership in order for them to decide if basic computer skill education is needed before the new HIT system is implemented. The information will also be shared with informatics department to be used when developing training, competency, and education support. The data will be used in developing the level one nursing informatics competencies. It may be that all departments can have the same level one competency because all nurses will be using a different system; however, this data may show that some departments need more support in achieving competency.

Section 4: Findings and Recommendations

Introduction

C Hospital is an acute care community hospital with about 280 practicing RNs. No standardized education or competency process exists to enhance nurses' IT knowledge and skills in their respective specialty areas. The organization is about to embark on implementing a new HIT system that will be used hospital-wide and brings comprehensive IT capabilities that do not currently exist. Without a process to ensure RNs are competent in the knowledge and use of the new HIT system, the implementation could fail or patient care could be compromised.

Currently, there are various levels of competence among nurses using the HIT system that exists today. Areas such as the operating room, emergency department, procedural areas, and Family Place have minimal to no use of the IT systems. The nurses use a paper documentation process with minimal HIT system use. All inpatient units use an HIT system exclusively for all their patient care; however, due to lack of a standard nursing informatic competency process, the level of competence and confidence in the use varies among them.

Findings and Implications

A needs assessment survey was sent out to all hospital-based nurses, approximately 380 nurses via e-mail link. It was a validated and reliable questionnaire called the Stagers Nursing Computer Experience Questionnaire. There were demographic questions added along with two questions that focused on how many months it took the nurses to feel confident in using the current HIT system and what they

felt would help them learn the system quicker, which was an open-ended question. About 55% of nurses completed the first few demographic questions and about 44% of nurses completed the entire questionnaire.

Response among departments varied, with the majority from the Family Place. The length of time in the RN role was determined, and 49% had over 10 years nursing experience. Another 24% had between 5-10 years of experience. Computer use was not as prevalent as it is today 10 or more years ago, which means some of these nurses may never have touched a computer, used MSWord or any other computer application at any educational level. It took approximately 48% of the respondents 2 or more months to feel confident in using the current HIT system or any portion of it, and the current system is not nearly as comprehensive as the future one. About 81% of those nurses have been practicing 5 or more years with almost half of them practicing for over 10 years. This indicates that there is a larger learning curve for those with greater years of practice.

A section of the questionnaire addressed general computer applications using a Likert scale of 0-4, with 0 representing no confidence to a 4 equal to the greatest confidence. Some questions addressed behaviors such as writing papers, searching the web, and creating pictures where the percentage of a 3-4 on the Likert scale ranged from 53%-75%. The organization strongly supports a continuing education environment, which may be why this number is significant. This helps with some basic computer skills when using IT. Only 66% had a confidence level of 3-4 for computer assisted instruction. Only 11% of nurses have taken a college level informatics course and 14% have taken a computer science college course. Only 14% have taken a class on use of MSWord. This

represents the low percentage of nurses who have received any form of IT knowledge or skill.

Under the section of questions regarding current HIT use, 15 nurses never responded, leaving 150 respondents in this section. The highest confidence levels were in data entry and the lowest were in data analysis. Nurses were confident in entering the data, but analyzing it was more challenging for them. This is not surprising given that the education they receive today is concentrated on data entry, not on data management or analysis. There was a question that asked about nurse level of computer experience on a 0-10 scale, with 0 being novice to 10 being expert. The table below shows that results. A majority were in the advanced beginner to proficient range.

Table 1

Level of Nurse's Computer Experience

	Response Percentage
0	8.63%
1	1.44%
2	3.6%
3	5.76%
4	7.19%
5	19.42%
6	15.83%
7	17.99%
8	17.27%
9	2.88%
10	0.0%

The last question was an added question that asked the nurses what would help with accelerating the learning curve for computer clinical system proficiency. The following themes emerged from the comments.

- Set up two classes, one for slower and one for quicker learners.
- Increase the training time/classes.
- Don't assume everyone is at the same learning level.
- Provide hands-on real-life scenarios.
- Have a buddy system, where a slower learner is paired with someone who is more proficient.
- Have experts on the units for every shift so their questions can be answered in real time.
- Provide a basic computer course addressing components that apply to the HIT system.
- Follow up on the units to ensure staff are using the system correctly.

Recommendations

There are gaps in current education process of the HIT system where it is taking staff up to 3 months to feel confident in the using the system. The HIT system of today is not as comprehensive as the Cerner system that will be implemented in the fall. The system will impact the entire hospital, and those departments that document on paper today will be documenting in Cerner in the future. There is a transition process, orientation process, and optimization process being developed to ensure staff becomes proficient in the use of the new HIT system.

The transition process will include the following:

- voluntary video guided learning opportunities that will start late Spring;
- mandatory video learning series that will be complete prior to training class;
- drop in education sessions to receive extra training and practice offered prior to and during training;
- a subject matter expert in each department who can provide one-on-one coaching;
- a total of 18-20 hours of education for nurses that integrate didactic and simulation, with our own subject matter experts as training staff;
- a training computer site created called parallel charting for staff to practice;
- competencies completed by the instructor and support staff for each training class, with the results to be shared with the leadership of the units, where the nurse educator can support the nurse in closing the education gap; and
- all nurses receiving phase I competencies 1-2 months out that will show their proficiency in using the system in real practice.

The orientation process will include:

- use of Lights On Network that can track staff use of the system behind the scenes and automatically recommend education videos, which in conjunction with competencies will enhance the nurse's optimization of use;
- class training, but fewer hours;
- video guided training;

- class training competencies, where results will be shared with leadership to help support the nurse in closing the education gap;
- phase I competencies implemented in about one month; and
- extra support from IT education department.

The optimization process will include:

- class training as indicated;
- competencies created to that optimization and added to phase I competencies;
- use of Lights On Network; and
- extra support from IT education department.

Through a standardized nursing informatics competency program, nurses will be supported in optimizing the use of Cerner. All nurses can reach the proficient level of competence, whereas in current state there are varying levels of competency.

Contribution of the Doctoral Project Team

The IT education department and nurse informatics department will play a role in implementing competencies at training and providing leadership on the units in regard to the results using the Light On Network. Nurse educators on the units will help to further enhance proficiency in use and contribute to the phase I competencies. The nurse educators in the departments will implement and contribute to enhancing the phase I competencies. Leadership on the units will ensure that phase I competencies are completed and support has been provided for nurses as needed. All team members will be involved in the continuous process improvement of the training and competencies.

In looking beyond, the DNP project, there will be phase II competencies created that will focus more on management and analysis of patient data. The same survey will be distributed about 1 year after the Cerner system has been implemented. This will give the organization a summative evaluation on how effective the nursing informatics program was in helping nurses to be more comfortable with computers and the use of Cerner. This program could spread to all ambulatory practices, and its concepts could be adopted for ancillary departments.

Strengths and Limitations of the Project

The organizational need for this program and the timing of implementing a new HIT system brings significance to the project. There is a strong culture of support that senior leadership provides in ensuring the implementation of Cerner is a success, which includes optimization of use from frontline staff. There is support from the IT education department and nursing informatics department in promoting and ensuring this project is a success. The project utilizes resources that are already in place in the organization.

A limitation to the project is the unknown. Developing nursing informatics competencies for an HIT system that has not yet been in use will pose some challenges. There may be functionalities discovered upon live use of the system that are not integrated into the competencies or functionalities the organization decides to delete upon live use. This means that a continuous formative evolution of the program will be crucial to providing meaningful improvements.

Section 5: Dissemination Plan

The information of the survey and project plan was disseminated at the quarterly leadership meeting where nurse educators, nurse managers, and nurse directors all attended. Times will be scheduled with the leadership of the departments to disseminate the information to nurses at their staff meetings. The project will be circulated in nursing journals and nursing conventions once completed.

Analysis of Self

This project has advanced my knowledge and skills in facilitating change, enhancing quality improvement, collaboration, and contributing to advocacy and policy change. I was the key representative of nursing with the Cerner implementation project, where I had to advocate for the nursing practice in making many design, workflow, education, and training decisions. I built the confidence to inquire about nursing practice decisions and developed the skill of providing evidence to challenge those decisions when appropriate. I have felt nothing but supported, coached, and encouraged by the staff in the IT education and nursing informatics department to facilitate this change that will enhance patient quality. It has given me the confidence to search for further quality improvement projects, knowing that I now possess the knowledge and skills to facilitate change, and I have also further gained the respect and trust within the organization.

Summary

The doctoral project gives the scholar the knowledge and skill to facilitate change, implement evidence-based quality improvements, disseminate nursing knowledge in promoting quality improvement, and advance nursing practice.

References

- American Association of Colleges of Nursing (AACN). (2014). Nursing shortage. Retrieved from <http://www.aacn.nche.edu/media-relations/fact-sheets/nursing-shortage>
- American Association of Colleges of Nursing. (2009). The essentials of baccalaureate education for professional nursing practice. Retrieved from <http://www.aacn.nche.edu/education/pdf/BaccEssentials08.pdf>
- American Association of Colleges of Nursing (AACN). (2006). The essentials of doctoral education for advanced nursing practice. Retrieved from <http://www.aacn.nche.edu/publications/position/DNPEssentials.pdf>
- American Nurses Association. (2015). *Nursing informatics: Scope and standards of practice* (2nd ed.). Silver Spring, MD : Nursesbooks.org.
- Ball, M. J., Douglas, J. V., Hinton Walker, P., DuLong, D., Gugerty, B., Hannah, K., . . . Troseth, M. R. (Eds.). (2011). *Nursing informatics: Where technology and caring meet* (4th ed.). London, England: Springer-Verlag.
- Benner, P. (1984). *From novice to expert: Excellence and power in clinical nursing practice*. Menlo Park: Addison-Wesley, pp. 13-34.
- Buntin, M. B., Burke, M. F., Hoaglin, M. C., & Blumenthal, D. (2011). The benefits of health information technology: A review of the recent literature shows predominantly positive results. *Health Affairs*, 30(3), 464-71.

- Centers for Disease Control and Prevention. (2011). Program performance and evaluation office (PPEO)—Program evaluation. Retrieved from <http://www.cdc.gov/eval/materials/index.htm>
- Chang, J., Poynton, M., Gassert, C. & Staggers, N. (2011). Nursing informatics competencies required of nurses in Taiwan. *International Journal of Medical Informatics*, 80, 332-340.
- Chung, S. & Staggers, N. (2014). Measuring nursing informatics competencies of practicing nurses in Korea. *Computers, Informatics, Nursing*, 32(12), 596-605.
- Cuban, L. (2004). Computers meet classroom: Classroom wins. Retrieved from <http://sdexter.net/xyz/CompMeets%20Classroom.pdf> .
- Doody, C. & Doody, O. (2011). Introducing evidence into nursing practice: Using the IOWA model. *British Journal of Nursing*, 20(11), 661-664.
- Fetter, M. (2009). Graduating nurses' self-evaluation of information technology competencies. *Journal of Nursing Education*, 48(2), 86-90
- Gann, M. (2015). How informatics nurses use barcode technology to reduce medication errors. *Nursing*, 45(3), 60-66.
- Grove, S.K, Burns, N., & Gray, J. R. (2013). Understanding quantitative research design. In S. K. Grove, N. Burns, & J. R. Gray, *The practice of nursing research: Appraisal, synthesis, and generation of evidence* (7th ed.; pp. 195-213). St. Louis, MO: Saunders Elsevier.
- Harrington, L. (2015). American Nurses Association releases new scope and standards of nursing informatics. *AACN Advanced Critical Care*, 26(2), 93-96.

doi:10.1097/NCL0000000000000065

Hodges, B. C., & Videto, D. M. (2011). *Assessment and planning in health programs*

(2nd ed.). Sudbury, MA: Jones & Bartlett Learning.

Hoover, A. (2008). Educational learning theories: Informing the fundamentals of

instruction. *International Journal of Applied Aviation Studies*, 8(2), 363-370.

Hughes, S., Livingston, J., Semler, R. & Hughes, A. (2014). Improving nurse computer

proficiency with a tri-focal educational intervention. *International Journal of*

Urological Nursing, 8(3), 161-165.

Hwang, J. & Park, H. (2011). Factors associated with nurses' informatics competency.

Computers, Informatics, Nursing, 29(4), 256-262.

Kettner, P. M., Moroney, R. M., & Martin, L. L. (2008). *Designing and managing*

programs: An effectiveness-based approach (3rd ed.). Thousand Oaks, CA: Sage Publications.

King, J., Patel, V., Jamoom, W. & Furukawa, M. (2014). Clinical benefits of electronic

health record use: National findings. *Health Research and Educational Trust*,

49(1), 392-402

Lin, H., Hsu, M. & Yang, C. (2014). The influences of computer system success and

informatics competencies on organizational impact in nursing environments.

Computers, Informatics, Nursing, 32(2), 90-99.

Matney, S., Brewster, P., Sward, L., Cloyes, K. & Stagers, N. (2011). Philosophical

approaches to the nursing informatics data information-knowledge-wisdom

framework. *Advances in Nursing Science*, 34(1), 6-18.

- McCartney, P. (2011). Integrating informatics competencies into practice. *Health Information Technology, 267*.
- Menachemi, N. & Collum, T. (2011). Benefits and drawbacks of electronic health record systems. *Risk Management & Healthcare Policy, 4*, 47-55.
- NLN Position Statement. (2008). Preparing the next generation of nurses to practice in a technology rich environment: an informatics agenda. Retrieved from <http://www.nln.org/docs/default-source/professional-development-programs/preparing-the-next-generation-of-nurses.pdf?sfvrsn=6>
- Numminen, O., Meretoja, R., Isoaho, H. & Leino-Kilpi, H. (2013). Professional competence of practicing nurses. *Journal of Clinical Nursing, 22*(10), 1411-1423.
- Panno, J. (1992). A systematic approach for assessing learning needs. *Journal of Nursing Staff Development, 8*(6), 253-290.
- Radley, D., Wasserman, M., Olsho, L., Shoemaker, S., Spranca, M. & Bradshaw, B. (2013). Reduction in medication errors in hospitals due to adoption of computerized provider order entry systems. *Journal of the American Medical Informatics Association, 20*(3), 470-476.
- Schleyer, R., Burch, C. & Schoessler, M. (2011). Defining and integrating informatics competencies into a hospital nursing department. *Computers, Informatics, Nursing, 29*(3), 167-173.
- Smith, S. (2012). Nurse competence: A concept analysis. *International Journal of Nursing Knowledge, 23*(3), 172-182.
- Sperhac, A. & Clinton, P. (2008). Doctorate of nursing practice: Blueprint for excellence.

Journal of Pediatric Health Care, 22(3), 146-151.

Staggers, N. (1994) The staggers nursing computer experience questionnaire. *Applied Nursing Research*, 7(2), 97-106.

Staggers, N., Gassert, C. & Curran, C. (2001). Informatics competencies for nurses at four levels of practice. *Journal of Nursing Education*, 40(7), 303-316.

Zoho Survey. (2017). Create online surveys with ease. Retrieved from <https://www.zoho.com/survey/>

Tellez, M. (2012). Nursing informatics education past, present, and future. *Computers, Informatics, Nursing*, 30(5), 229-233.

Technology Informatics Guiding Education Reform Initiative. (n.d.). Evidence and informatics transforming nursing: 3-year action steps toward a 10-year vision. Retrieved from <http://www.aacn.nche.edu/education-resources/TIGER.pdf>

Yoon, S., Shaffer, A. & Bakken, S. (2015). Refining a self-assessment of informatics competency scale using Mokken scaling analysis. *Journal of Interprofessional Care*, 29(6), 579-586.

Appendix A

July 25, 2016

Dear :

Thank you for your interest in the Stagers Nursing Computer Experience Questionnaire (SNCEQ). Enclosed please find a copy of the instrument. I hope you find it useful.

The instrument was originally developed as part of a larger study. The article in Applied Nursing Research in 1994 describes development and pilot testing for the instrument. The instrument was then used in a main study with a sample of 110 clinical nurses in 1991, 98 nurses in 1998 and 20 nurses in 2006. The instrument was last revised in 1998.

There has been much interest in this instrument, and many authors have used the scale in their studies. Additional reliability testing was done by a graduate student who examined home health nurses' attitudes toward computers. The resulting internal consistency reliability for the first 6 sub-scales is listed below:

- General computer applications = .86
- Knowledge of above = .89
- Use of HIS = .92
- Knowledge of above = .95
- Role participation = .88
- Role Knowledge = .89

The scoring for the instrument is straightforward. The subscales are summed separately for computer use and knowledge, except that the score for knowledge about CASE tools is omitted for the first subscale. You may report total and/or subscale scores as part of your results. The novice to expert scale is separate and not included in the total score for the instrument.

In a study completed in late 1999, a graduate student used only the scales for computer applications and HIS (minus the role questions). Her calculated Cronbach's alpha was .89. However, please be aware that the validity assessments were completed for the instrument with all scales, so validity is not known without the roles subscales.

If you have any other questions, please let me know. You may reach me at e-mail address: nancystagers@sisna.com.

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