

Informatics Competencies for Nursing and Healthcare Leaders

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Abstract

Historically, educational preparation did not address informatics competencies; thus managers, administrators, or executives may not be prepared to use or lead change in the use of health information technologies. A number of resources for informatics competencies exist, however, a comprehensive list addressing the unique knowledge and skills required in the role of a manager or administrator was not found. The purpose of this study was to develop informatics competencies for nursing leaders. A synthesis of the literature and a Delphi approach using three rounds of surveys with an expert panel resulted in identification of informatics competencies for nursing leaders that address computer skills, informatics knowledge, and informatics skills.

Introduction

With the goal that all Americans have an electronic health record (EHR) by 2014, health care leaders must be prepared to select, adopt, and implement EHRs as well as other health information technologies (HITs). Historically, nursing education did not include informatics competencies; thus, current managers, administrators, or nurse executives may not be adequately prepared to use or lead change in the use of HITs. Healthcare organizations are beginning to emphasize the need for informatics competencies appropriate for leadership roles. In fact the American Organization of Nurse Executives (AONE) included informatics in its recent update of competencies for nursing executives, but most competencies were stated broadly and needed further specifications to translate them for implementation.¹

More recently, the TIGER Initiative (Technology Informatics Guiding Education) identified that all nurses in every role must be prepared to make HIT the stethoscope of the 21st century. TIGER is a collaborative of 120 diverse organizations working together to educate nurses “to use informatics tools, principles, theories, and practices to make health care safer, more effective, efficient, patient-centered, timely, and equitable by interweaving enabling technologies transparently into nursing practice and education.”² Management’s role is pivotal in organizational transformation using EHRs and other HITs. In fact, one of the seven pillars of the Tiger Initiative focuses on management and leadership;

however, competencies in this area are yet to be defined. A number of resources for informatics competencies exist, however, a comprehensive list addressing the unique knowledge and skills required in the role of a manager or administrator was not found.³⁻⁷ Therefore, the purpose of this study was to develop informatics competencies for nursing leaders.

Method

Informatics competencies for nursing leaders were developed through review of the literature and validated through a Delphi approach. The investigators used the AONE Nursing Executive Competencies¹ to identify the roles and functions of the nursing executive or nursing leaders aspiring to be executives. Informatics competencies from the literature were identified.³⁻⁷ Competencies from each of these sources were categorized as computer skills, informatics knowledge and informatics skills, using the framework developed by Staggers, Gassert, and Curran.⁷ The combined competencies were then evaluated for redundancy and reworded for consistency. The initial list of competencies was again compared with AONE’s Nursing Executive Competencies. Some items were deleted, others reworded, and additional competencies added to reflect the role and functions of nursing leaders. Further subcategories were identified for categorizing competencies.

The first survey resulting from this process included a total of 119 items with 38 competencies addressing computer skills, 37 addressing informatics knowledge, and 44 addressing informatics skills. Within each of these three major categories were subdivisions for easier comprehension of content areas. Computer skills included: basic software applications, administration applications, electronic communications, data access and decision support, patient documentation and monitoring, education, systems, and research. Informatics knowledge included: data, impact, ethical and legal issues, systems, education, research, and usability and ergonomics. Informatics skills were categorized as: management, system requirements and selection, design and development, fiscal management, implementation, analysis and evaluation, and system maintenance.

A Delphi approach was used for obtaining consensus on the competencies. A purposive sample of 13 nursing leaders, informaticians, and researchers was selected from the American Medical Informatics Association Nursing Informatics Working Group, the Minnesota Organization of Nursing Leaders, and the University of Minnesota School Of Nursing. The Expert Panel consisted of registered nurses with a master's degree or higher and a minimum of five years of experience in nursing informatics, leadership in a practice setting, or research. Three rounds of surveys were completed for validating the competencies, with each successive round including refinement from results of the previous survey. Experts were given a copy of the AONE Nursing Executive Competencies and a list of the Informatics Competencies for Nursing Leaders developed by the investigators. The Panel was asked to rate the relevance of each item for nursing leaders on a 4-point Likert-type scale: 1) not relevant, 2) somewhat relevant, 3) quite relevant, and 4) very relevant. Experts also were asked to reword any items that were not clear. Open ended questions were included for additional recommendations.

Analysis

A content validity index (CVI) was calculated,⁸ which is the proportion of ratings for a competency that were very or quite relevant. A threshold of 80% agreement was established for determining consensus on competencies. All responses were entered into Excel and a percent agreement calculated for each competency. All competencies with 80% agreement were retained, but wording changes or reorganization of competencies recommended by respondents were made. The investigators examined competencies with ratings less than 80% for relevance based on the AONE Nursing Executive Competencies and reworded items for additional testing if they addressed an area in the AONE competencies. All other competencies with less than 80% agreements were deleted.

Results

In the first of three rounds of surveys, the return rate was 92%. Based on the responses to the survey, rewording of 34 competencies was recommended, 28 competencies were deleted, two competencies added, and four competencies were moved to another category. Participants identified the following reasons for deleted competencies: the competency was relevant for the role of the nursing informatician, end user, or researcher rather than the role of the

nurse leader; or, it was not an informatics competency. Examples of competencies for nurse informaticians rather than the nurse leader included: "extracts data from clinical data sets;" or, "prepares process flow charts to describe current and proposed information flows for all aspects of clinical systems." An example of a competency rated less than 80% that was reworded included: uses project management software to plan and track progress of projects. This competency was reworded as "uses project management software." Based on the results of round one, there were a total of 93 competencies: 24 competencies addressed computer skills, 36 addressed informatics knowledge, and 33 informatics skills.

The response rate for the second survey was 83%. All competencies were rated at or above 80% agreement except five. In the category of computer skills, 2 competencies addressed using project management software and using up-to-date information science and technology as a strategic tool to promote self-health. The first competency was changed and the second deleted. "Uses project management software" competency was modified for the final survey with an emphasis on the role of the leader to include "develops the project scope, objectives, and resources for each proposed application, system, or enhancement" and "assure principles and concepts of project management are used for the implementation of information systems." Under the category of informatics knowledge, two competencies were rated at 70%: "describes how various hardware or network issues affect decisions about information systems," and "summarizes limitations of computer programs due to design and computer or network capacity at a general level." It was recommended to simplify these competencies by removing the verb and using simple concepts that address only one idea per competency where possible. The competency "collaborates on oversight to assure that testing plans are developed, implemented and evaluated at every phase of system implementations" was rated at 78% and the investigators decided to retain this competency for round three of the survey. Additional changes included recommended wording, regrouping of competencies, and removing additional redundancies identified by participants. Based on the results of round two, there were a total of 91 competencies: 24 competencies addressed computer skills, 38 addressed informatics knowledge, and 29 informatics skills.

The response rate for round three of the survey was 83%. All competencies were rated as 80% or higher in this round except two, which were deleted. One was identified as a research competency and the second was a duplicate of another competency. The research competency that was removed was “using software for qualitative data analysis or text mining.” Participants identified that one competency, “[knowledge of] ergonomics of work station, bed side and portable technology apparatus in practice” included multiple concepts and this competency was split into separate competencies. Rewording recommendations were made and recommendations for reorganizing competencies. Based on the results of round three, there were a total of 92 competencies: 24 competencies addressed computer skills, 40 addressed informatics knowledge, and 28 informatics skills. The results of the final survey included the following categories and subcategories as shown below in Tables 1 - 3.

Table 1. Computer Skills

Basic Software Applications
Word processing software
Spreadsheet software (e.g., Excel)
Presentation software (e.g. PowerPoint)
Internet browsers
Advances Software Applications
Forecasting
Budgeting
Human resources
Quality assurance
Staffing/Determining patient acuity
Statistical analysis
Synthesizing the whole patient picture from a multidisciplinary perspective
Planning and making decisions
Electronic Communications
Composing e-mails
Sending confidential documents
Participating in group communication
Access Data/ Information
Navigating systems (e.g., file servers)
Searching information retrieval systems
Distance-learning
Patient Related Applications
Documenting patient assessments
Creating care plans
Documenting nursing interventions
Documenting outcomes of care
Monitoring trends in patient outcomes
Supporting patient education

Table 2. Informatics Knowledge

Management Concepts
Management of system implementations
Avoidance of potential negative impacts
Allocating financial resources
Inclusion of nursing information within systems
Communicating a vision about the benefits
Anticipating changes in economic and business processes
Analysis of interprofessional workflow processes
Revising processes from workflow analysis
Decisions impacting clinical IS implementation, use, and maintenance
Change management
Data Issues
Health care data standards
Importance of integrating nursing data elements in systems
Importance of integrating standardized nursing languages in systems
Data quality issues
Data reporting issues
Information Systems Concepts
Value of clinicians' involvement in at all appropriate phases
Strengths and limitations of applications related to software programming language or design
Strengths and limitations of applications related to hardware/ networks
Technological trends, issues and new developments as they apply to nursing
“Work arounds” and the consequences of these
Human - computer interface interactions
Ergonomics of work station, bed side
Ergonomics of adjunct technologies
Ergonomics of portable technology
Application of IS technologies to clinical practice
Application of IS technologies to administration
Application of IS technologies to clinical research situations
Staff Education
Levels of informatics knowledge by roles
Methods for education
Clinical Research
Evaluating internet resources
Methods for evaluation of IS implementation and use
Reuse of patient/ administrative data for research
Application of informatics research for practice
Ethical/ Legal Concepts

Patients' rights r/t computerized information management
Principles of data integrity
Ethical principles for collection, maintenance, use, and dissemination of data and information
Application of HIPAA to information systems
Compliance with IRB for research with data from information systems
Policies and procedures consistent with regulatory and accrediting requirements for IS
Intellectual property, copyright, and fair use of copyrighted material

Table 3. Informatics skills

Requirements And System Selection
Develop project scope, objectives, and resources
Integrate patient care processes and nursing administrative functions in system requirements
Involve front-line staff in the development of system requirements
Involve front-line staff in the development of system selection
Specify system requirements based on the needs of the organization
Collaborate with interprofessional team in system selection process
Evaluate information systems in practice settings
Advocate for the development (or purchase) and use of integrated, cost-effective health information systems within the organization
Advocate new applications meet standards for interoperability
Financial
Priorities are within budget constraints and organizational priorities
Alternatives for funding information systems
Costs and benefits analysis applied for in practice, education, administration, and/or research
Financial and staffing implications of ongoing updates to information systems
Actual vs budgeted costs for implementing nursing-related information systems
Collaborate with interprofessional team around financial issues
Implementation/ Management
Implementation of systems consistent with the vision, mission, strategic and tactical plans
Use project management for implementation of IS
Manage the impact of change due to IS

implementation
Front-line staff are involved in appropriate aspects of design, implementation, and testing related to their practice
Improve the use of informatics within nursing practice
Collaborate with interprofessional team to manage information systems
Ethical/ Legal Concepts
Access to system information
Use of data (obtaining, storing, and disseminating text, data, images, or sounds)
Access to personal health information (PHI – HIPAA language)
Analysis/ Evaluation
Consistency with organizational policies, external licensing, accreditation, and regulatory agency requirements
Ensure testing plans are evaluated at every phase of system implementation
Ensure that front-line staff (users) are involved in the evaluation of information systems
Collaborate with interprofessional team to evaluate information systems

Discussion

Informatics competencies for nursing leaders were developed through a review of the literature and a Delphi process that included three rounds of surveys using an expert panel of experienced nursing leaders, informaticians, and researchers. The first round resulted in significant changes, while the second and third rounds were more editorial. There was considerable feedback from participants about informatics competencies for the nursing leader versus competencies for the nurse informatician or other nursing roles. Participants commented that informatics competencies for nursing leaders should emphasize knowledge and skills for planning, coordinating, supporting, directing, and evaluating informatics initiatives rather than “doing.” For instance, nursing leaders do not need to actually perform specific informatics skills such as use project management software. The one exception was the need for leaders to be competent in computer skills.

The purpose of developing informatics competencies was to identify those areas related to nursing leadership, which included front line managers to the nursing executive. Similar to the levels of public health users,⁶ informatics competencies for nursing leaders varies based on their level of management.

For instance, the front line manager's role requires documenting patient care in EHRs while the role of the nursing executive is focused on procuring financial support for the EHR.

Participants who were nursing informaticians also identified that there may be differences in competencies for nursing leaders based on the reporting relationship of the informatician. Some nurse informaticians report to the chief informatics officer (CIO) while others report to the chief nursing officer. A CIO may require greater technology knowledge and skills while a nurse executive may require a greater emphasis on use of informatics in nursing.

Another key message from participants was an emphasis on interdisciplinary coordination. Nursing leaders must have computer and informatics knowledge and skills to work with other disciplines, but clearly can not operate in a silo. This influenced the development of the competencies to emphasize the interdisciplinary nature of informatics.

Conclusion

This study contributes to the identification of competencies that are unique to the role of the nursing leader. Informatics competencies that address computer skills are similar to previously identified competencies.³⁻⁷ However, informatics knowledge and skills are unique in this study. In future research, competencies need to be leveled by nursing leadership roles and responsibilities. Additionally validation also is needed to determine the applicability across health care settings.

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