

NURSING INFORMATICS SPECIALIZATIONS IN MASTER OF SCIENCE (MS)-NURSING PROGRAM: A CASE STUDY OF SOME UNITED STATES UNIVERSITIES

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Nursing Informatics is the "science and practice (that) integrates nursing, its information and knowledge, with management of information and communication technologies to promote the health of people, families, and communities worldwide (AMIA). Nursing Informatics is dedicated to the collection, selection, organization, processing, management and dissemination of information and similar content with the help of computing and information technologies. Worldwide universities and institutions are moving towards development of new age programs in different fields. In medical and health sciences too such educational innovations are running. Here due to demand of IT Nursing staffs such programs have been designed by many educational enterprises. Nursing Informatics as a program of study is mainly available in MS-Nursing and PhD program. Here in this paper several aspects of Nursing Informatics has been provided and importantly the running programs of US based universities also been provided.

Keyword: Nursing informatics, Nursing IT, Information Technology, Health Computing, Health and Medical Sciences, IT Management, Healthcare Systems, Medical Information System

INTRODUCTION

Nursing informatics is a kind of novel profession of health sciences which deals and responsible for several aspects and matter specifically to the health. Nursing informatics techniques and technologies bringing out several new connections and solutions that has been changed nursing sciences many ways. Nursing informatics educated are dedicated to the progressive patient outcomes including cost effectiveness in the field of healthcare and also establishment of the new tools and systems for teaching as well as for patient care. Here information technology and information management principles heavily deployed (ASU Official Site, 2016, DeSouza, S. I. et.al, 2014, Paul, P.K. et.al. 2013).

Nursing Science and Information technology including other sciences such as cognitive science, computer science, information science combined *Nursing informatics* as a field of study and program. The patient care and their enhancement many ways are possible with the development, analysis including evaluation of information systems used by several emerging technologies (Yucel, G., Cebi, et.al. 2012).

Nursing Informatics is a kind of practice based domain, and thus students here need to watch, apply, analyze, as well as practice processes, skills relevant to nursing informatics. Betterment of the leadership in nursing many ways positively may bring by the Nursing Informatics utilization (Bertelsen, L. B. P.et.al.2015, Cummings, E., Borycki, E. M., and Madsen, I. 2015 and Paul, P.K.,2013).

OBJECTIVES

The core aim, agenda of this conceptual paper is includes (but not limited to the following)—

- To identify about Nursing informatics and Nursing IT including such as its characteristics, features etc.
- To learn about the possible roles, functions of the recent and potential Nursing informatics professionals in short.
- To learn the running educational programs in Nursing Informatics domains with its credits, specialization model etc in brief in United States.
- To learn about the promising and planned educational and research programs in the Nursing informatics domain.

Nursing Informatics

Nursing informatics is a domain of practice and theory and combining with nursing science and also computing or information management. Identification, define, manage, as well as communication of data, information, knowledge etc for better nursing practice is the main agenda for Nursing Informatics. Nurses, consumers, patients, including other healthcare team and stakeholders play a lead role for better and healthy healthcare systems. Nursing Informatics also helps in enhanced, modern, remote nursing informatics performance. Healthcare decision-making, enriched nursing many ways possible with healthy Nursing Informatics integration. Ultimately it will provide the desired outcomes (Bertelsen, L. B. P., and Christian, N. Ø. H. R., 201 and AIMA, 2016 and Transforming Healthcare Industry, 2016). Nursing Informatics deals with the Information structures, information processes, information modeling for a solid role in the fulfillment of the same

Programs on Nursing Informatics

Nursing informatics is specifically required for the Nursing Professionals and allied healthcare professionals. In the educational market Nursing Informatics as a Full Course of study is rarely available. But recently the programs have been started in Nursing programs, mainly in Nursing Informatics with MS-Nursing specialization and concentration. The program has the potential to meet the criteria for the emerging nurses for numerous types of job positions in several organizations (Paul, P.K., J. Ganguly, A. Sinha, 2013 and Paul, P.K., R K Sinha, J Ganguly, M Ghosh 2015). Nursing informatics and IT bridging the skills gap and also expands of their ICT knowledge for betterment and advancement in healthcare in clinical organization. Organizations in today's age require qualified health informatics professionals and here Nurses having Nursing informatics skills manages healthcare systems as well as other health care providers. Nursing Informatics also helps in better public health organizations. Here is a detailed list of programs with coursework and academic matters have been provided in next section.

Why MS-Nursing in Nursing Informatics and Where

Nursing informatics professionals basically involved in communication as well as computing. The Nursing informatics professionals also work as a teacher, researchers with higher rank chief nursing officer, Nursing CTO etc. the capabilities and role of software engineers, systems engineers, implementation consultants etc also requires in health and medical settings. Nursing informatics professionals these days also engaged as Policy developers including the business owners. Some of the working areas of Nursing informatics are include—

Nursing informatics professionals responsible for the concept representation including standards and also support evidence-based practice. Nursing informatics professionals also engaged in the research and education facets.

Nursing informatics also deals the Data/ communication standards including principles to build an interoperable data infrastructure. Nursing informatics consult the Research methodologies to circulate a healthy and fresh knowledge into practice.

There are several other reason for the Nursing Informatics practices worldwide which include but not limited to the—

- Leadership, control and management in addition to management.
- Risk analysis and management of Nursing informatics areas.
- Compliance of the patient safety including management
- Consultation with the peers and researcher for solid Nursing informatics practices
- Educational, research and professional training in the domain including Health informatics
- Nursing informatics policy as well as its development and importantly advocacy
- Research and evaluation in the field of Nursing informatics and Health Informatics
- Nursing Project management in practice
- Advocating patient and health professionals
- Managing the Informatics specialist programs with manager or director
- Managing and helping in clinical applications analyst

- Help in clinical data specialist.

Nursing informatics practices needed for more healthy and improved clinical settings and arrangement. The following are United States based Nursing informatics programs with brief details.

University of Pittsburg, United States

The University of Pittsburg, United States offers a Nursing Informatics program as a specialization of Master of Science Nursing (Nursing Informatics, University of Pittsburg, 2016). The detailed program structure are include (See Table: 1)—

Table: 1-MS-Nursing (Nursing Informatics) at The University of Pittsburg, US

MS-Nursing (Nursing Informatics) Concentration Year 1
Fall Term (Year 1)
NUR 2044 Graduate School Orientation 0 cr.
NUR 2011 Statistics for Evidence-Based Practice 1 3 cr.
NURSP 2075 Introduction to Health Informatics 3 cr.
NURSP 2388 Database Management 1.5 cr.
NURSP 2383 Methods in Technology Evaluation and Usability 1.5 cr.
Spring Term (Year 1)
NUR 2000 Research for Evidence-Based Practice I 2 cr.
NURSP 2070 Information Technology Project Management 3 cr.
NURSP 2076 Clinical Information Systems 3 cr.
Summer Term (Year 1)
NUR 2010 Health Promotion and Disease Prevention for Culturally Diverse Populations 3 cr.
NURSP 2082 Informatics Theories and Issues 3 cr.
NURSP 2092 Leadership Development 3 cr.
NUR 2007 Research for Evidence-Based Practice II 2 cr.
MS-Nursing (Nursing Informatics) Concentration Year 2
Fall (Year 2)
NURSP 2085 Nursing Informatics Practicum 1 3 cr.
Spring (Year 2)
NURSP 2086 Nursing Informatics Practicum 2 3 cr.
NURSP 2090 Healthcare Outcomes 3 cr.
Comprehensive Exam

In this university Nursing Informatics specialization is offered in both first year and second year respectively.

University of Colorado, Denver

The University of Colorado at Denver is also offers a Health Informatics with Nursing Informatics specialization (UC Denver Official Web, 2016). The detailed program structure are include (See Table: 2)—

Table: 2-MS-Nursing (Nursing Informatics) at University of Colorado, US

MS-Nursing (Health Informatics)	
Core Nursing Courses	Health and Nursing Informatics Courses
NURS6010: Philosophical, Theoretical and Ethical	NURS6794: Decision Support
NURS6286: Foundations of Healthcare Informatics	NURS6274: Semantic Representation
NURS6022: Health Systems, Policy and Social Justice	NURS6289: Information Systems Life Cycle
NURS6031: Research Methods for Advanced Practice	NURS6759: Advanced Nursing Practicum: Healthcare Informatics
Specialty Options	
NURS6279: Knowledge Management	
NURS6284: Digital Tools for Connected Health	
NURS6285: Human Computer Interaction Design	
NURS6286: Foundations of Health Care Informatics	
NURS6293: Database Management Systems	
NURS6796: Executive Leadership	

This program of Nursing Informatics (Health Informatics) is also offered as Master of Science Nursing specialization. The program has some electives and offered based on need.

Duke University, School of Nursing

Duke University School of Nursing offered a Nursing Informatics program as a specialization of Master of Science-Nursing (University of Duke, Nursing Informatics, 2016). The detailed program structure are include (See Table: 3)—

Table: 3-MS-Nursing (Health Informatics) at Duke University, US

MS-Nursing (Health Informatics)	
Core Nursing Courses	Health and Nursing Informatics Courses
Nurse as Scholar I: Science Development, Study Design and Statistics	Database Systems in Healthcare: Design, Management and Connectivity
Nurse as Scholar II: Evidence-based Practice	Introduction to Health Informatics
Population Health in a Global Society	Health Information Exchange Standards, Methods, and Models
Professional Transitions: Advanced Nursing Practice	Data Analytics 1
	Informatics Research Seminar-1
	Informatics Research Seminar-2
	Health Information Technology Leadership
	System Design, Implementation , Evaluation, and Maintenance
	Facilitating and Assessing Learning in Non-Academic Settings
	Data Analytics 2
	Synthesis of Specialty Practice

12 Credit Basic Nursing Curriculum and 24-Health Informatics. A 36 Credit Program

Nursing Informatics at this university is include Database Management, Data Analytics, Systems Analysis and Design etc

University of Utah

The University of Utah offers Master of Science Nursing with Nursing Informatics as a specialization. The program focused with many Informatics Technology practical components which include Human Computer Interaction, Database Design, Bio Statistics (University of Utah, Official Nursing Informatics Site, 2016). The detailed program structure are include—

Table: 4 Adopted model of MS-Nursing (Nursing Informatics) of University of Utah

Health and Nursing Informatics Core Courses
Computer Science Fundamentals for Clinicians
Systems Analysis and Implementation
Foundations of Healthcare Informatics
Statistics for Biomedical Informatics
Clinical and Public Health Terminology
Human Systems Interaction
Project Management in Health Informatics
Clinical Database Design
Approved Elective
Clinical Decision Support
Interprofessional Education Experience 1
Interprofessional Education Experience 2
NI Professional Role and Collaboration
Masters Synthesis

34.5 Credit Specialization in Nursing/ Health Informatics is needed

The University also permits to take these coursework at the Doctoral level program also as a Major and Minor.

University of Maryland, School of Nursing, Baltimore

Nursing Informatics program at the School of Nursing, Baltimore offered a Full-fledged MS-Nursing (Nursing Informatics) program (University of Maryland, Nursing Informatics official page, 2016). The program is include practicum and theory including management science principles. Refer Table: 5.

Table: 5 Adopted model of MS-Nursing (Nursing Informatics) of University of Maryland, US**MS- Nursing (Nursing Informatics)**

Systems and Population in Healthcare
 Organizational and Professional Dimension of Nursing Practices
 Technology Solutions for Generating Knowledge in Healthcare
 Healthcare Database Systems (Summer)
 Managerial Health Finance
 Application of Science for Evidence Based Practices
 Bio Statistics
 Organizational Theory
 System Analysis and Design
 Human Factors of HCI
 Nursing Informatics Concept and Practice
 IT Project Management

40 Credit Specialization in Nursing Informatics is needed

University of Maryland and its Nursing Informatics program is interdisciplinary in nature and deals with several components of Psychology, Philosophy too.

American Sentinel University

Nursing Informatics program at ASU comes with Health Informatics specialization. It offers basic Nursing Informatics courses including internship and project in the field. Refer Table: 6.

Table: 6 Adopted model of MS-Nursing (Health Informatics) of American Sentinel University, US**MS-Nursing (Health Informatics)**

Core Nursing Courses	Health and Nursing Informatics Courses
Role Development	Clinical and Administrative Systems
Advanced Pathophysiology	Healthcare Informatics
Theoretical Foundation	Healthcare Data Analytics
Research Design	Healthcare Project Management
Advanced Pharmacology	Information Security and Privacy in Healthcare
Advanced Physical Assessment	Environment
	MSN Capstone

18 Credit Basic Nursing Curriculum and 18 Credit of Nursing Informatics. A 36 Credit Program

The MS-Nursing (Health Informatics) at ASU is prepared with a balance of basic nursing science and nursing informatics.

Few Possible Programs in Other Context

Nursing Informatics is an emerging program and spreading worldwide. Though there is a potentiality to offer the domain in other specialized area too. Here is a sample and proposed programs in Science context (Table: 7).

Table: 7 Some possible Nursing Informatics programs in the context of Science domain/s.

Possible Bachelor Degrees	Possible Masters Degrees
BS/BSc- Nursing Informatics	MS/MSc- IT and Nursing Informatics
BS/BSc-Medical Information Sciences	MS/MSc -Medical Information Sciences
BSc- Information Technology (Nursing Informatics)	MSc- Information Technology (Nursing Informatics and Telemedicine)
BSc-Computer Science (Nursing Informatics)	MSc-Computer Science (Nursing Informatics and Telemedicine)
BSc-Computer Application (Nursing Informatics)	MSc-Information Science (Nursing Informatics)
	MSc-Computer Application (Nursing Informatics and Telemedicine)

It is a fact that Humanities is also deal with the human being as well as societal aspects including facets etc (Paul, P.K., 2013, Sahu, M., Grover, A., and Joshi, A. 2014). And here at humanities health is also a most important concern. Few proposed programs have been depicted herewith (Table: 8).

Table: 8 Nursing Informatics fields in the Humanities and Social Sciences

Possible Bachelor Degrees	Possible Masters Degrees
BA (Nursing Information Systems)	MA (Nursing Information Systems)
BA Public Administration with Nursing Informatics	MA Public Administration with Nursing Informatics
BA Public Nursing with Nursing Informatics	MA Public Nursing with Nursing Informatics
BA Sociology with Nursing Informatics	MA Sociology with Nursing Informatics
BA Social Work with Nursing Informatics	MA Social Work with Nursing Informatics
BSW (Nursing and Medical Information Systems)	MSW (Nursing and Medical Information Systems)

SUGGESTION

Nursing informatics need to start in several nomenclature with focus on Health Science, Computing, Informatics, Information Science degrees.

Nursing informatics programs may also offers as BTech/MTech Specialization in India and other countries.

More industrial linkages and collaboration with the practicing points are highly appreciated for its solid output.

MS/MSc-Health Informatics program is available in many countries and here Nursing Informatics programs may be started.

In general Documentation as well as Informatics principles need to use for creating a healthy Nursing informatics programs

CONCLUSION

Nursing informatics is an advance domain of practice and theory and majorly available universities worldwide in the healthcare and nursing departments rather IT and Computing sections. Nursing informatics with MS-Nursing is available in many US universities. Though Nursing Informatics is could be started in other level of education including the Bachelors, MPhil, PhD etc.

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