Application of Nursing Informatics: Need to Transform into Reality

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ABSTRACT

The current health care system is facing several challenges and one of which is informatics in nursing. It also explores the potential impact of integration in nursing education and practice. The article focuses on seven themes emerged by Canadian Nurses Association to build the philosophy of nursing informatics and they are: antithesis, artifact, agency, utility, technique, network and power. The article furthers with the necessity to transform the nursing informatics into reality by identifying barriers to success of nursing informatics and extended with recommendations drawn from the Technology Informatics Guiding Education Reform Initiative.

Keywords: *Nursing Informatics, Antithesis, Artifact, Agency, Utility, Technique, Network, Power*

INTRODUCTION

The term 'Informatics' was first coined in 1957 by German computer scientist, Karl Steinbach as 'Informatik' followed by Phillippe Dreyfus in 1962 as 'Informatique' and further translated into 'Informatics' by Walter F Bauer. The term informatics combines the terms 'information' and 'automation' to name automatic information processing. As new information and communication technologies emerged over the past three decades, the term Nursing Informatics (NI) has evolved to encompass all usage of technologies within the scope of nursing practice, education, research and administration [1].

In 1994, the American Nursing Association refined a NI definition to encompass this new role stating ' NI is the speciality that integrates nursing science, computer science and information science in identifying, collecting, processing and managing data and information to support nursing practice, administration, education, research and the expansion of nursing knowledge [2]. The NI model [3] is shown in figure 1.NI facilitates the integration of data, information and knowledge to support patients, nurses and other providers in their decision making in all roles and settings. This support is accomplished through the use of information structures, information processes and information technology [1].

Currently, NI is an emerging field of study. National nursing organizations support the need for nurses to become computer literate and versed in the dynamics of NI. Over the past few decades, the field of informatics has become focus of a large body of research, theory development and scrutiny across most disciplines.
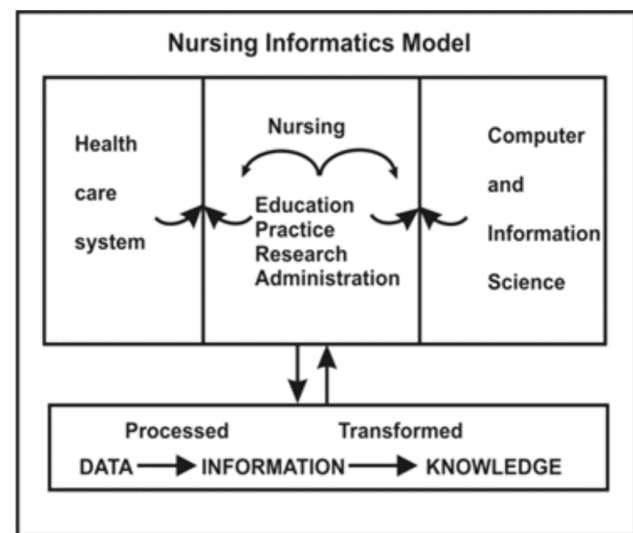

Fig. 1. Nursing Informatics model

In order to address both the visible and hidden aspects and nuances of informatics in nursing, seven themes were emerged from extensive review of literature by Canadian Nurses Association. These themes have been fashioned into a conceptual framework that focuses on seven perspectives of informatics: antithesis, artifact, utility, technique,

agency, networks and power. The conceptual model shaped by philosophies [4] is shown in figure 2.
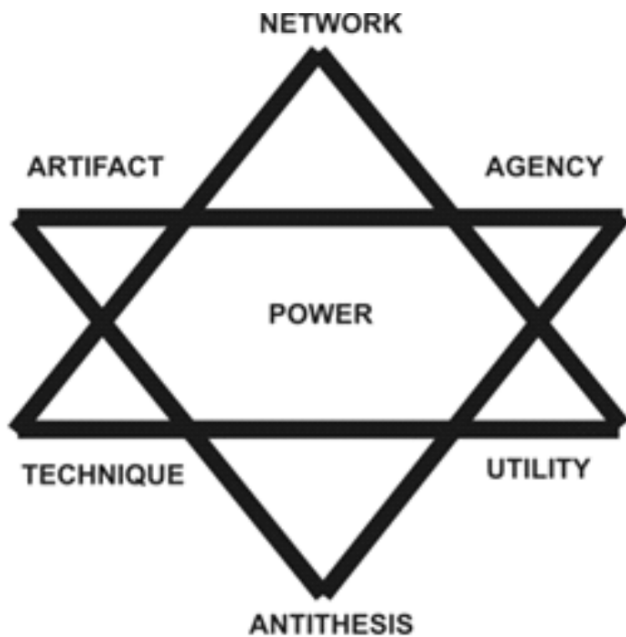

Fig: 2: Conceptual model shaped by philosophies

Antithesis: To begin an analysis of NI related theory, it is logical to examine the concept of antithesis. Since this dystopic idea seems to be the primary causes of resistance to information technology within nursing, it highlights the gender issues inherent in this process and emphasizes the need for nurses to be critically involved in how technology is allowed and assumed within nursing practice [5] .

Artifact: Cultural artifacts or artifacts within nursing are human made objects that reflect both professional and workplace characteristics such as values, norms, myths, sagas, symbols, rituals, ceremonies, this includes the use and placement of objects within nursing practice. Artifact refers to the notion that technology of all kinds, including the contemporary inclusion of information technologies in nursing is as inherent, almost seamless cultural phenomenon, one that is long standing and can be taken for granted as part of nursing evolution. Technologies from simple to complex, have served as long standing artifacts within nursing culture, along with other tools, documentations, physical and organizational structures and more recently information systems. Technology in the form of computers and software's has been shaped to improve and enhance human cognition, facilitate collaboration and communication and support task performance.

Artifacts are thus considered to be the crucial element that binds user cognition, information processing, workload management and task accomplishment. The subject (nurse) interacts cognitively and behavior (activity) with the mediating artifact (technology) motivated by the achievement of the objective or object, which means the provision of nursing care to clients. This activity is coupled with conscious psychological tools which support the application and evolution of nursing practice [6].

Utility: Another common conception of technology, including information technology is founded in modernism. The notion that computers and machines used in nursing practice are simply tools that nurse's control within their practice. This reflection is very common in the nursing literature, usually embedded within an organizational culture, to support the use of technologies in a utilitarian manner. Nurses in all specialities are required to care for patients and develop the technical knowledge not only to manipulate machinery but interpret the world around them [4]. Nursing and hospital information systems are promoted as benign, efficient software that can save time, repetitive charting and make nurses documentation easily available to physicians, other nurses and the entire interdisciplinary team at the click of a button [7] .

Technique: One of the strongest and most far-reaching current trends in health care is the application of evidence- based practice through development of research and information technology. This trend is visible across all sectors of nursing and the rationale behind this trend is to improve client care by selecting best practice options grounded in viable research and to expand the theoretical foundations of all health professions. The ultimate goal is to shift health care decisions, choices and actions to a higher, more scientific, research and theoretically- based level [8].

Agency: Human – computer interactions occur within sociocultural and sociostructural contexts, a notion that has sparked research and theory that strives to account for the social role of technology within the workplace and other arena of society. Informatics is contextual by nature, entangled with the work done to gather it. There is a co-evolution of the environment and the system, the technology, work and clinician are interwoven agents of change. Human agency is often motivated by personal and collective efficiency. An agent is a computer system capable of flexible

autonomous action in a dynamic, unpredictable and open environment. Agent technology is considered the foundation for next generation technology [9].

Networks: Nurses and technologies interact to form actor networks within the workplace arena. New technologies are also used to facilitate networks between nurses and other health care professionals. These networks manifest as virtual nursing and interdisciplinary work teams, interest groups, communities of practice and other collaborative configurations. In essence, all organizations consist of networks: system of people configures into work teams, occupations, specialties and hierarchical layers linked by relationships and all generally focused on a central goal. In case of health care, the central goal is the provision of health care to a network of clients. Often, nursing virtual social network are created for the purpose of exchanging ideas on practice issues and best practices, to become more knowledgeable about new trends, research and innovations in health care [10].

Power: A final glance at the lens of power is important for nursing to examine the dynamics or disciplinary and individual power in the context of utilizing information technology within nursing. Much of the contemporary nursing literature supports a noticeably strong modernist philosophy of nursing power, especially in relation to the integration of technologies into nursing practice [11]. Nursing is a field that has striven to establish itself as a legitimate discipline in the eyes of other health profession groups. With the emergence of information technology, the inclusion of computers and eventually information and communication technologies in nursing has become a way to boost prestige and influence within health care system [12].

Impact of informatics on nursing

NI is a small but growing specialty area in nursing. NI is a relatively new, but rapidly growing discipline that has tremendous potential to improve the quality, effectiveness and efficiency of nursing practice, administration, education and research. Nurses providing direct care must be prepared to use information systems, access information sources and communicate their information systems needs to those responsible for developing new systems.

All nurses can utilize management concepts to help identify, collect and record data pertinent to nursing care. Regardless of the practice setting: clinical practice, administration, research or education- technology can be used to support nursing in direct and indirect care practice. The beginning nurse needs to have basic competencies such as computer literacy and protecting confidentiality of health care information while using the information system. The experienced clinician builds on the competencies of the beginning nurse and also facilitates to identify data elements necessary for practice and documentation activities. The informatics specialist needs to possess knowledge of the system life cycle, which are initiation, development, implementation and operation of the information system [13].

Educators in nursing can utilize technology- driven instruction for both nurses and clients. More and more online classes are being conducted using the internet. Nurses can obtain bachelors, master's and even doctoral degrees using technology. Computers can help to manage the data surrounding courses such as registration, maintenance of student grades and course certificates. The educator may teach the technical components of how to use a particular software application. An informatics educator also teaches nursing staff and students about the clinical, legal and ethical standards behind the documentation and methodology [14].

Integration into nursing curricula

This new and expanding field addresses the efficient and effective use of information for nurses. Preparing nurses for computerization is essential to confront an explosion of sophisticated computerized technology in the workplace. It is critical in a competitive health care market for preparing nurses to use the most cost-effective methods. A model is presented that identifies six essential factors for preparing nurses for computerization. Strong leadership, effective communication, organized training sessions, established time frames, planned change, and tailored software are the essential factors to consider for development of a successful educational program.

NI content is being integrated into nursing educational courses as another strategy to promote computer literacy. Technology content is being integrated into courses in response to faculty and student demand. The full integration of NI into educational programs regardless of the method of integration selected requires an educational strategy. This implementation of the education strategy generally requires a) framework/model b) strategic

plan c) milestone chart and d) technology resources, staff and budget.

Advantages of online education in nursing

- Online education in nursing increases accessibility for students in rural areas.

- Online educational settings offer nursing students the ability to collaborate with colleagues on other geographic areas through participation in online group activities, thus increasing opportunities for social professionalism.

- Using online databases to stay up to date on current research and can make decisions based on that research, thereby increasing the possibility of improved health care

- Participation in online instructional activities and learning exposes nurses to the very technology that is becoming so central to nursing practice [15].

Transforming Nursing Informatics into reality- a new challenge:

Computer and telecommunication systems have proven to be effective management tools for health care data and communication of this information to other healthcare professionals and their use will become the way of the future. To cite the classic change model, we have moved through phases of substitution and replacement and we are now entering into transformation of health. Major challenges remain and we must complete vital tasks to make this transformation a reality. The new paradigm for knowledge transfer involves both content and the methods of learning and using the content.

The use of computers in education has become commonplace. In a study among 162 nurse teachers, it is found that teachers are not familiar with the software that is available for nursing education purposes. Teachers also lack confidence in their own abilities to cope with computer-assisted education. The information systems used in practical nursing are often inaccessible to nurse teachers. The teachers themselves say they would regularly need further training in their own computer skills [16].

The science of nursing informatics has evolved to aid in the management of nursing data. A study suggests that disciplines such as nursing, which are information intensive, require the careful investigation into the use of computers to process nursing information and nurses need to feel comfortable working with computerized data. Nursing leaders, such as the American Nurses Association (ANA) support skilled information management and in 1992, officially established the role of the informatics nurse specialist, offering the first credentialing exam in 1995 [17].

The full integration of NI into nursing education is essential to the health of the nursing profession as it faces the 21st century. NI, which encompasses new technologies, supports the nursing profession's goal of achieving computer literacy. To accomplish this goal, educators must integrate informatics into their basic, advanced and continuing nursing programs. The major obstacle to the success of NI has been reluctance on part of nursing faculty to integrate it into nursing curricula. The four factors accounting to it are given below:

- Since the majority of nursing educators were generally not computer literate, they have had difficulty embracing technology

- There have been a limited number of informatics experts and qualified faculty available to teach and upgrade their colleagues' skills

- Only a few educational programs are available that can educate faculty to this new speciality

- Educational institutions have not allocated sufficient funds for technology resources [18].

The Technology Informatics Guiding Education Reform (TIGER) Initiative responded to the lack of nursing involvement in meeting federal initiatives by convening more than 40 nursing professional organizations to create a vision and a three-year action plan. The TIGER Initiative "aims to enable practicing nurses and nursing students to fully engage in the unfolding digital era of health care". To reach its goals, TIGER established the following recommendations for schools/ institutions of nursing:

- Adopt informatics competencies for all levels of nursing education (undergraduate/graduate) and practice (generalist/specialist).

- Encourage faculty to participate in development programs in informatics.

- Develop a task force or committee at each school/ institution to examine the integration of informatics throughout the curriculum.

- Encourage the Health Services Resources Administration's Division of Nursing to continue

and expand its support for informatics specialty programs and faculty development.

• Measure changes from baseline in informatics knowledge among nursing educators and students and among the full range of clinicians seeking continuing education.

• Collaborate with industry and service partners to support faculty creativity in the design, acceptance, and adoption of informatics technology.

• Develop strategies to recruit, retain, and educate current and future nurses in the areas of informatics education, practice, and research [19].

CONCLUSION

All health care professions now rely on advances in biomedicine and technology that influence the use of informatics in health care and nursing. The nation is at the tipping point in applying enabling technologies to health care. The time has come for health care to leave the manual tools of the past in the past and turn to the enablers in the new millennium. The nursing profession is being transformed to meet the needs of the new world and will be a major player in the revolution. The nurse of the future will play a key role as an information mediator and facilitate the use of technology by consumers of health care. Technology will drive health care and nursing and in turn nursing has the opportunity to channel the technology to render higher quality, evidence based health care.

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