

The Nursing Informatician's Role in Mediating Technology Related Health Literacies

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Abstract. The advent of computer based technology and the internet have not changed nurses' responsibility for patient education; but they are rapidly changing what we teach and how we teach. The challenge for nursing informaticians is to create innovative patient education models and applications with the goal of achieving literate, engaged, empowered and informed patients as well as preparing health professionals to maximize the advantages offered by digital media and other new technology based tools. This paper explores the interrelationship of basic literacy, health literacy and technology related literacies that provide the foundation for achieving these goals.

Keywords. Digital Health Literacy; Patient Education; ePatients, eHealth literacy

1. Introduction

Patient and professional education has been a long standing responsibility of nursing the world over for centuries. The advent of the internet did not change that responsibility; but it is rapidly changing what we teach and how we teach. Key principles underlying the education process have also remained constant. For example, the education process begins by assessing the learner's knowledge, attitudes and skills as a basis for providing learner specific education. The internet and related technologies are now providing us with new models and tools for assessing patients, students, families, and communities and creating the opportunity for innovative interventions to meet the educational needs of the ePatient and eStudent. The challenge for the nursing informatician is to create innovative education models and applications for achieving the goals of (1) engaging, empowering and informing patients and (2) preparing health professionals to maximize the advantages offered by these new tools.

Meeting these challenges requires an understanding of digital health literacy and the literacies that are foundational to the concept of digital health literacy. In describing literacy levels a variety of literacy types have been identified. This paper explores basic literacy, health literacy and the technology related literacies that relate directly to the

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education of patients and healthcare providers in today's interactive networked world. Successful use of communication related technology tools in healthcare depends on a synthesis of basic literacy, computer literacy, information literacy, digital literacy and health literacy. These specific literacies are both overlapping and interrelated as illustrated in Figure 1.

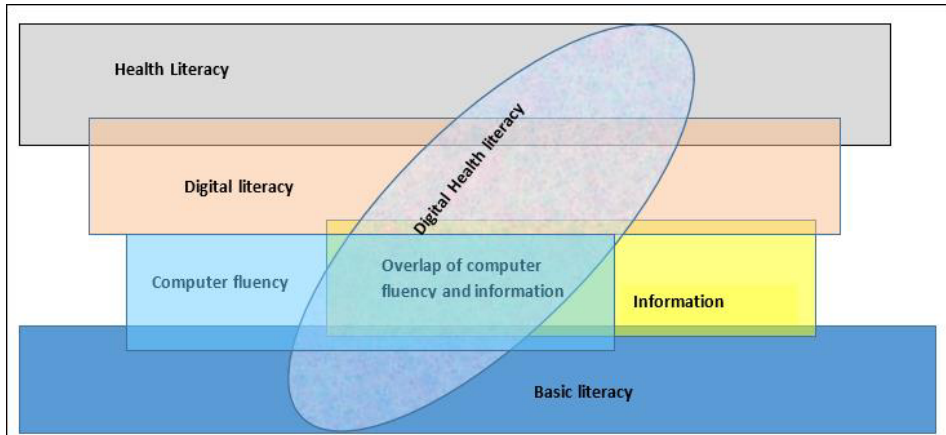


Figure 1. Overlapping Relationships of Technology Related Literacies and Basic Literacy.

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2. Definition of Basic Literacy

In 2003, UNESCO proposed an operational definition that encompasses several different dimensions of literacy. “Literacy is the ability to identify, understand, interpret, create, communicate and compute, using printed and written materials associated with varying contexts. Literacy involves a continuum of learning in enabling individuals to achieve their goals, to develop their knowledge and potential, and to participate fully in their community and wider society.”^[1]

This definition focuses on the ability to absorb and understand information in printed or written format. However, using this ability when the format moves from paper to a computer is not intuitive. Computer literacy involves much more than the ability to read or interpret information using a computer. Even the term computer literacy with its limited focus is becoming outdated.

3. Definition of Computer Literacy/Fluency

The National Academy of Science (NAS) coined the term “FIT Persons” to describe people who are fluent with information technology.^[2] FIT Persons possess three types of knowledge:

- Contemporary Skills which include the ability to navigate and use current computer applications such as an internet search engine.
- Foundational Concepts which include understanding the how and why of information technology. This knowledge gives the person insight into the

opportunities and limitations of social media and other information technologies.

- Intellectual Capabilities which include the ability to apply information technology to actual problems and challenges of everyday life.

By 2006, the NAS, reflecting the ever growing types of computer based and digital technologies, was using the term *technologically literate person*, but the framework of contemporary skills, foundational concepts and the ability to apply these to everyday life remained.^[3] As nursing informaticians continue to identify content and structure learning opportunities for healthcare providers and patients/consumers/clients this framework provides an overall organizing structure for that work.

4. Definition of Information Literacy

The American Library Association (ALA) has supported the development of information literacy standards since the 1980s. The ALA defines information literacy as “a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.”^[4] The United Nations Educational, Scientific and Cultural Organization (UNESCO) defines information literacy as “the ability to recognize when information is needed and to locate, evaluate, effectively use and communicate information in its various formats.”^[5]

The concept of information literacy acknowledges that different types of knowledge and skills are needed to evaluate health information posted on Facebook, versus Wikipedia, versus an on-line peer-reviewed pre-published article versus a peer-reviewed published article. The concept of information literacy also acknowledges professional students need different writing skills when participating in an online dialog as opposed to preparing a term paper. Developing appropriate learning experiences and educational standards to master these skills are the challenges facing informaticians in the world of social media and engaged patients/consumers.

5. Definition of Digital Literacy

The term digital literacy first appears in the literature in the 1990s. However, to date there is no generally accepted definition. While the definition is currently evolving a review of those published reflect many of the same concepts. One of the earliest definitions was provided by the Aspen Institute Communications and Society Program and the John S. and James L. Knight Foundation. “Digital and media literacy are defined as life skills that are necessary for participation in our media-saturated, information-rich society.”^[6] Nelson and Joos defined digital literacy as including:

- Competency with digital devices of all types including cameras, eReaders, smartphones, computers, tablets, video games boards, etc. This does not mean that one can pick up a new device and use that device without an orientation. Rather, one can use trial and error as well as a manufacturer's manual to determine how to effectively use a device.
- The technical skills to operate these devices as well as the conceptual knowledge to understand their functionality.

- The ability to creatively and critically use these devices to access, manipulate, evaluate and apply data, information, knowledge and wisdom in activities of daily living.
- The ability to apply basic emotional intelligence in collaborating and communicating with others.
- The ethical values and sense of community responsibility to use digital devices for the enjoyment and benefit of society. ^[7]

Digital literacy is a more comprehensive concept than computer or information literacy. Digital literacy does not just mean that one knows how to use digital tools; it is also about understanding the implications of digital technology and the impact it is having, and will have, on every aspect of our lives. While there is not a generally accepted definition, there are a number of books published about digital literacy. A search of Amazon in October 2015 returned 174 books with the term “digital literacy” in the title, the first published with a copyright date of 2010. However, if the search is limited to the Amazon categories of medicine or health no results are returned. Using the key term of health returned eight books, two of which included a chapter on digital literacy and health. Informaticians are challenged to close this gap in the literature.

6. Definition of Health Literacy

While health literacy is concerned with the ability to access, evaluate and apply information to health related decisions, there is not a consistent generally accepted agreement on the definition of this term. In 2011, a published systematic review of the literature in Medline, PubMed and Web of Science identified 17 definitions of health literacy and 12 conceptual models. The most frequently cited definitions were from the American Medical Association, the Institute of Medicine, and WHO ^[8]. Current definitions from these organizations include:

- American Medical Association defines health literacy as “the ability to obtain, process and understand basic health information and services needed to make appropriate health decisions and follow instructions for treatment.”
- The Institution of Medicine uses the definition of health literacy developed by Ratzan and Parker and cited in Healthy People 2010. Health Literacy is “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.”
- The World Health Organization (WHO) defined health as “the degree to which people are able to access, understand, appraise and communicate information to engage with the demands of different health contexts in order to promote and maintain good health across the life-course.”

The focus in each of these definitions is on an individual's skill in obtaining, processing and understanding the health information and services necessary to make appropriate health decisions. While these definitions are congruent with the Web 1.0 model of information access, where health information is posted on websites for access by patients/consumers/clients they do not address the interactive world of Web 2.0 or the evolving Web 3.0 or the “internet of things.” In recognition of this deficiency, Norman and Skinner introduced the concept of eHealth as “the ability to seek, find,

understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem.”^[9] This definition acknowledges the need for computer fluency and the use of information skills to obtain an effective level of health literacy; however it is not sensitive to the impact of social media. Creating a comprehensive definition and model for assessing health literacy levels that include social media literacy skills are needed for today's communication processes and remains a challenge for informaticians.

7. Conclusion

While each of the technology related communication literacies focuses on a different aspect of literacy and has a different definition, they overlap and are interrelated. Figure 1 demonstrates those interrelationships. In this Figure, basic literacy is depicted as foundational to all other literacies. Digital literacy builds on computer and information literacy as well as other social media related knowledge and skills not currently included in the definitions of computer and information literacy. Health literacy requires both digital literacy and a basic knowledge of health.

The concept of digital health literacy incorporates each of these literacies. It includes contemporary skills, foundational concepts and the ability to apply these to everyday life. While each of the different literacies create unique challenges, mastering these challenges requires a synergistic approach. Such an approach makes it possible to develop effective digital health educational programs for patients and providers. Such programs make it possible to develop engaged, empowered and informed patients as well as prepare health professionals to maximize the advantages of working with such patients/consumers/clients.

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