



## ELECTRONIC HEALTH LITERACY: ESSENTIAL SKILLS FOR CONSUMER HEALTH

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**ABSTRACT** Consumer-directed electronic resources, from online interventions to informational websites, require the ability to read text, use information technology, and appraise the content of these tools to make health decisions. If e-Health is to realize its potential for improving the health of the public, the gap between what is provided and what people can access must be acknowledged and remedied. e-Health literacy is influenced by a person's presenting health issue, educational background, health status at the time of the e-Health encounter, motivation for seeking the information, and the technologies used. Like other literacies, e-Health literacy is not static; rather, it is a process-oriented skill that evolves over time as new technologies are introduced and the personal, social, and environmental contexts change.

**KEYWORDS :** Health, E-Literacy, Information Technology, Consumer, Media, Scientific

### INTRODUCTION

Consumer-directed electronic resources, from online interventions to informational websites, require the ability to read text, use information technology, and appraise the content of these tools to make health decisions. Yet, even in countries with high rates of absolute access to the Internet, such as the United States and Canada, over 40% of adults have basic (or prose) literacy levels below that which is needed to optimally participate in civil society [1, 2]. A multi-country study of information technology use and literacy found that as literacy skill levels rise, the perceived usefulness of computers, diversity and intensity of Internet use, and use of computers for task-oriented purposes rise with it, even when factors such as age, income, and education levels are taken into account [3]. If e-Health is to realize its potential for improving the health of the public, the gap between what is provided and what people can access must be acknowledged and remedied.

Greater emphasis on the active and informed consumer in health and health care [4] in recent years has led to the realization that ensuring the public has both access to and adequate comprehension of health information is both a problem [5] and an achievable goal for health services [2,3]. A recent report from the US Institute of Medicine (IOM) entitled *Health Literacy: A Prescription to End Confusion* looked at the relationship between health and literacy and found that those with limited literacy skills have less knowledge of disease management and health promoting behaviors, report poorer health status, and are less likely to use preventive services than those with average or above average literacy skills [6].

### HEALTH LITERACY

The Institute of Medicine report focuses largely on health literacy, using the following definition (originally proposed by Ratzan and Parker [7]) "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" [7].

This definition underscores the importance of contextual factors that mediate health information and the need to consider health literacy in relation to the medium by which health resources are presented. Within a modern health information environment, this context includes the following: interactive behavior change tools, informational websites, and telephone-assisted services, which are all being deployed globally to promote health and deliver health care (eg, [8-11]). However, even among North American adolescents, the highest Internet-use population in the world, many teens report that they lack the skills to adequately engage online health resources effectively [12]. There is a gap between the electronic health resources available and consumers' skills for using them. By identifying and understanding this skill set we can better address the context of e-Health service delivery [13].

As we witness the impact that basic literacy has on health outcomes, questions arise about how literacy affects e-Health-related outcomes

and experiences [14]. But unlike literacy in the context of paper-based resources, the concept of literacy and health in electronic environments is much less defined. Consumer e-Health requires basic reading and writing skills, working knowledge of computers, a basic understanding of science, and an appreciation of the social context that mediates how online health information is produced, transmitted, and received—or what can be called *e-Health literacy*. A definition and model of e-Health literacy is proposed below that describes the skills required to support full engagement with e-Health resources aimed at supporting population health and patient care.

### Literacy Model

#### *The Lily Model*

Eng (2001) defines e-Health as "the use of emerging information and communication technology, especially the Internet, to improve or enable health and health care [15]; this is one of many published definitions currently in use [16]. Taken in the context of the IOM's definition of health literacy stated above, the concept of e-Health literacy is proposed. Specifically, e-Health literacy is defined 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. Unlike other distinct forms of literacy, e-Health literacy combines facets of different literacy skills and applies them to e-Health promotion and care. At its heart are six core skills (or literacies): traditional literacy, health literacy, information literacy, scientific literacy, media literacy, and computer literacy.

Within the lily model, the six literacies are organized into two central types: *analytic* (traditional, media, information) and *context-specific* (computer, scientific, health). The analytic component involves skills that are applicable to a broad range of information sources irrespective of the topic or context while the context-specific component relies on more situation-specific skills. For example, analytic skills can be applied as much to shopping or researching a term paper as they can to health. Context-specific skills are just as important; however, their application is more likely to be contextualized within a specific problem domain or circumstance. Thus, computer literacy is dependent upon what type of computer is used, its operating system, as well as its intended application. Scientific literacy is applied to problems where research-related information is presented, just as health literacy is contextualized to health issues as opposed to shopping for a new television set. Yet, both analytic and context-specific skills are required to fully engage with electronic health resources.

e-Health literacy is influenced by a person's presenting health issue, educational background, health status at the time of the e-Health encounter, motivation for seeking the information, and the technologies used. Like other literacies, e-Health literacy is not static; rather, it is a process-oriented skill that evolves over time as new technologies are introduced and the personal, social, and environmental contexts change. Like other literacy types, eHealth

literacy is a discursive practice that endeavors to uncover the ways in which meaning is produced and inherently organizes ways of thinking and acting [17,18]. It aims to empower individuals and enable them to fully participate in health decisions informed by eHealth resources.

The six components of the e-Health literacy model are briefly outlined below.

### TRADITIONAL LITERACY

This concept is most familiar to the public and encompasses basic (or prose) literacy skills such as the ability to read text, understand written passages, and speak and write a language coherently [19]. Technologies such as the World Wide Web are still text dominant, despite the potential use of sound and visual images on websites. Basic reading and writing skills are essential in order to make meaning from text-laden resources. A related issue is language itself. Over 65% of the World Wide Web's content is in English [20], meaning that English-speakers are more likely to find an e-Health resource that is understandable and meets their needs.

### INFORMATION LITERACY

The American Library Association suggests that an information literate person knows "how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them" [21]. Like other literacies, this definition must be considered within the context of the social processes involved in information production, not just its application [19]. An information literate person knows what potential resources to consult to find information on a specific topic, can develop appropriate search strategies, and can filter results to extract relevant knowledge. If one views the Web as a library, with search tools (eg, Google) and a catalogue of over eight billion resources, the need for Web users to know how to develop and execute search strategies as well as comprehend how this knowledge is organized becomes imperative.

### MEDIA LITERACY

The wide proliferation of available media sources has spawned an entire field of research in the area of media literacy and media studies. Media literacy is a means of critically thinking about media content and is defined as a process to "develop meta cognitive reflective strategies by means of study" [22] about media content and context. Media literacy is a skill that enables people to place information in a social and political context and to consider issues such as the marketplace, audience relations, and how media forms in themselves shape the message that gets conveyed. This skill is generally viewed as a combination of cognitive processes and critical thinking skills applied to media and the messages that media deliver [23].

### HEALTH LITERACY

As discussed earlier, health literacy pertains to the skills required to interact with the health system and engage in appropriate self-care. The American Medical Association considers a health literate person as having "a constellation of skills, including the ability to perform basic reading and numerical tasks required to function in the health care environment. Patients with adequate health literacy can read, understand, and act on health care information" [24]. Consumers need to understand relevant health terms and place health information into the appropriate context in order to make appropriate health decisions. Without such skills, a person may have difficulty following directions or engaging appropriate self-care activities as needed.

### COMPUTER LITERACY

Computer literacy is the ability to use computers to solve problems [25]. Given the relative ubiquity of computers in our society, it is often assumed that people know how to use them. Yet, computer literacy is nearly impossible without quality access to computers and current information technology. For example, it is not helpful to learn PC-based commands on a Mac, to learn Windows 98 if one requires Windows XP, or be trained on a laptop when a personal digital assistant (PDA) is required for a task. Computer literacy includes the ability to adapt to new technologies and software and includes both absolute and relative access to e-Health resources. To illustrate this, Skinner and colleagues found that while nearly every Canadian teenager has access to the Internet, far fewer have the quality of access or the ability to fully utilize it for health [26,27].

### SCIENTIFIC LITERACY

This is broadly conceived as an understanding of the nature, aims,

methods, application, limitations, and politics of creating knowledge in a systematic manner [28]. The latter-mentioned political and sociological aspects of science are in response to earlier conceptions of science as a value-free enterprise, a position that has been vigorously challenged [28]. For those who do not have the educational experience of exposure to scientific thought, understanding science-based online health information may present a formidable challenge. Science literacy places health research findings in appropriate context, allowing consumers to understand how science is done, the largely incremental process of discovery, and the limitations—and opportunities—that research can present.

### THE SIX LITERACY TYPES

Taken together, these six literacy types combine to form the foundational skills required to fully optimize consumers' experiences with e-Health. A list of resources, many of them Web-based, that can be consulted to help health practitioners support patient-clients in improving their literacy skills across each domain. Although it would not be unexpected to find that older adults and those from non industrialized countries report greater difficulties in certain domains, particularly those that are context-specific. As work with highly Internet-connected populations (like North American adolescents) shows, many of whom we would expect to be skilled users, there is a lack of skills, opportunity, and environments to use e-Health to its fullest potential [12,26,27].

These six skill types illustrate the challenges that e-Health presents to those with low literacy in any one area. Although one need not have mastery in all these areas to benefit from e-Health resources, it can be argued that without moderate skills *across* these literacies, effective e-Health engagement will be unlikely. Unlike other areas of health care, there is no "best practice" solution to addressing problems of literacy that fits into a single session or neatly packaged brief intervention. Rather, improving literacy is a process that requires coordinated remediation and education, involving partnerships among patient-clients, practitioners, educators, and community health organizations over time. It is as much a process as it is an outcome.

Literacy is as much a process as an outcome and requires constant attention and upgrading. The key is to reach a level of fluency at which one can achieve working knowledge of the particular language (or skill), enough to function at a level conducive to achieving health goals. Knowledge, information, and media forms are context-specific, and context dictates what skills and skill levels are required to access health resources. For example, technical jargon may be appropriate in academic discourse provided it allows for a more precise explanation of certain concepts. However, when directed at non technical consumers or those outside of a particular research or practice culture, technical language may need to undergo a translation process in order to convey a message properly [29]. Whereas a scientist may be interested in acetylsalicylic acid, a patient requiring pain relief knows this substance only as Aspirin or ASA.

### CONCLUSION:

As the World Wide Web and other technology-based applications become a regular part of the public health and health care environment, viewing these tools in light of the skills required for people to engage them becomes essential if the power of information technology is to be leveraged to promote health and deliver health care effectively.

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