

## Fundamentals of Digital Health Literacy: A Review of the Literature

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### Abstract

This study aims to identify the concept of digital health literacy by reviewing contemporary literature. For this purpose, we examine not only a way of understating the concept but also its core competencies by comparing them to those of digital literacy and health literacy.

*Keywords:* digital health literacy, eHealth literacy, competency, digital literacy, health literacy

The COVID-19 pandemic necessitated transitioning almost every aspect of daily life into digital spaces. Education, employment, job searching and interviewing, commerce, healthcare visits, and accessing medical records and paperwork are only a few of many areas in which people's lives require digital skills and knowledge, which served to underscore the problems stemming from the digital divide in America (Collins-Warfield et al., 2019; Harambam et al., 2013; Scheerder et al., 2017). Although access to the Internet was seemingly ubiquitous in the U.S. before the pandemic, the COVID-19 pandemic shutdown and transition to digital platforms shone a light on the inequities of access in America.

The digital divide is concerned amid the COVID-19 pandemic, and in the succeeding years, many accommodations made to digital environments will become common or preferred practices. Unfortunately, such an eventuality will only widen the digital divide in America, leaving low literacy individuals unable to access vital resources, such as healthcare. Moreover, given that much information over health issues has been disseminated in the digital world more and more, the digital divide problem also significantly influences the health literacy (HL) of adults. In particular, during the COVID-19 pandemic, digital health literacy (DHL) has been considered a crucial ability to gain correct electronic health information, learn about health, and receive distance health care (Brørs et al., 2020; Chan & Kaufman, 2011; Conard 2019). In the post-COVID era, DHL could play a role in determining the correct online health information and actively engaging in health-related, proper decision-making for adults (Miller & West, 2007; Neter & Brainin, 2012).

Despite its importance, this newer concept of DHL is not yet explored enough. Many studies examined digital literacy (DL) and HL separately rather than understanding more comprehensively under the concept of DHL. Therefore, the purpose of this scoping literature review is to identify the concept of DHL for adults, a recently emerging subject matter area that is not well understood. For this, we sought to examine two research questions: (a) How does existing literature understand DHL? (b) What are the core competencies of DHL compared to those of DL and HL?

### Digital and Health Literacies

#### Digital Literacy (DL)

Early research on DL emphasized a practical use of technology and the ability to adapt one's skills. For example, Goodfellow (2011) described DL as simple know-how. Based on Pool's (1997) definition, Joosten et al. (2012) explained DL as an adaptation of "skills to an evocative new medium, [and] our experience of the Internet will be determined by how we master its core competencies" (p. 6). These researchers demonstrate that their understanding of DL means a person possesses specific technical skills.

More recent studies orient DL as cognitive skills and faculties rather than technical knowledge. Traxler and Lally (2016), as well as Bennett (2014), further developed Beetham and Sharpe's (2011) approach to the cognitive perspective of DL: "The functional access, skills, and practices necessary to become a confident, agile adopter of a range of technologies for personal, academic, and professional use" (p. 1). This perspective indicates the adaptability of DL to different contexts and purposes. Chan et al. (2017) also considered the adaptability of DL when they defined it as "the ability to understand and use information in multiple formats with emphasis on critical thinking rather than information and communication technology skills" (p. 2). Along with the varying definitions for DL available in the literature, researchers and theorists contribute to DL research exemplified particular perspectives, indicating convergent and divergent lenses for research.

### **Health Literacy (HL)**

The American Medical Association's Ad Hoc Committee on Health Literacy defined HL as the gathering of skills, comprising the capability to read and understand appointment slips, prescription bottles, and other health-related material, as well as perform numerical tasks essential to function in a health care environment (Bresolin, 1999). Since then, the definition of HL has evolved into "an achieved level of knowledge or proficiency that depends upon an individual's capacity (and motivation to learn) and the resources provided by the health care system" (Baker, 2006, p. 878). Over a decade later, Emmerton et al. (2012) declared that HL is the "ability to obtain, interpret and use health information" (p.12).

A body of research found the factors related to HL. The ability to understand printed health-related information accurately and interpret the information well enough to communicate effectively with healthcare providers is a significant factor that impacts HL (Ngoh, 2009). Additional factors influencing someone's HL are age, disability, completed education level, race/ethnicity, and poverty status (Kutner, 2006). Moreover, a national study also showed that those who had not earned a high school diploma had low HL (Kutner, 2006). Furthermore, disparities in HL are widely found within ethnic/racial minority groups who do not speak English as a first language and are from different cultures. Cultural beliefs can also impact communication between a patient and the healthcare provider, potentially causing confusion and leading to health mismanagement on the patient's end (Shaw et al., 2008).

### **Methods**

We conducted a systematic literature review to identify definitions of DHL and core competencies. The keywords for search include DHL, eHealth literacy, HL, core literacy competencies in underserved communities, low literacy, high literacy rate, literacy, and community-based programs, HL assessment, HL measures, health education, and health equity. The databases accessed to obtain quality literature were: OneSearch Search engine, EBSCO, electronic catalogs of published books, and ProQuest Research Library. In addition, we used resources from Google Scholar, Centers for Disease Control and Prevention (CDC), and the World Health Organization publications.

Our search focused on peer-reviewed journals written in English with no limitations for publication periods. We then used a matrix including the selected articles, types of articles, definition, literacy features, core competencies, and the relationship with digital, health, and digital health literacies to keep track of relevant literature. After all of these, we conducted a three-stage process. We first assessed the titles and abstracts of all literature to exclude research that targeted adolescents and teenagers). Next, we created a shortlist of potentially relevant literature to quickly retrieve the full text. We finally achieved agreements through regular online meetings among authors to synthesize each search.

## Findings

### What is Digital Health Literacy (DHL)?

DHL shares core aspects of HL, including access and use of healthcare services and the interaction between the patient and health professionals. Digital approaches enable the individual to be “an active participant in their health rather than being a passive participant” (Conard 2019, p. 277). Such a unique digital approach can expand the concept of health literacy by providing informal and formal health-related educational opportunities using multimedia. Digital health tools (e.g., health information portals, personal health records, telemedicine or teleconsultation, online support) allow users to make their health decisions, manage their health care, better communicate with health providers, and thus promote the individuals’ healthy lifestyle (Chan & Kaufman, 2011). Furthermore, DHL or eHealth literacy has become a critical ability to understand a vast range of electronic health information (Brørs et al., 2020).

DHL or eHealth literacy can be 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” (Norman & Skinner, 2006a, p. 2). Having the ability of DHL allows users to attain positive health outcomes. For example, the findings of recent studies highlighted that people with higher DHL are more likely to adopt preventive behaviors, including using preventative care services and having effective communication with health professionals on online platforms (Brørs et al., 2020; Li et al., 2021; Luo et al., 2018; Patil et al., 2021; Rosário et al., 2020; Vrdelja et al., 2021). Users with high levels of DHL also cognize the risk of unreliable online information (Neter & Brainin, 2012). In addition, DHL enables users to be involved in informed decision-making relevant to health (Miller & West, 2007).

### Core Competencies of DHL

We identified seven core competencies of DHL across analytical, context-specific, and socioecological aspects: (a) traditional literacy (basic literacy skills), (b) information literacy (understanding potential resources), (c) media literacy (critical thinking and assessing skills), (d) health literacy (understanding basic health information and making health-related decisions), (e) technology literacy (access to and use of digital technology), (f) scientific literacy (understanding and creating knowledge in a systematic manner), and (g) socioecological nature (trust and confidence in interaction with the contexts and environment) (Bautista, 2015; Liu et al., 2020; Norman & Skinner, 2006a, 2006b; Paige et al., 2018a; van der Vaart & Drossaert, 2017).

DHL shares several core aspects of DL and HL. All literacies require three common skillsets: (a) information literacy – analytical skills to understand potential resources (e.g., ability not only to develop appropriate strategies for search but also to filter findings to related knowledge; ability to transfer learning from online instructional videos to implementation in real life; ability to look beyond apparent resources and understand what is available), (b) scientific literacy – creating knowledge in a systematic manner (e.g., understanding methods and applications; understanding the user interface; conceptualizing and navigating application menus; understanding most health information and resolving the issues when there is conflicting information), and (c) socioecological nature related to how individuals interact with the online environment (e.g., trust in digital health; positive health-related quality of life; being confident in their use of digital devices and technology; communication with doctors and other healthcare providers; being confident to share concerns with providers).

In the case of DHL and DL, context-specific skills to understand how to use digital devices and information technology are required. Meanwhile, the ability to understand written health information/instructions about treatments/medications and read or write

correctly to complete medical forms are critical in all literacies. While basic literacy, including daily reading habits, improves HL rates, basic literacy and HL have distinctions (Murray et al., 2008).

In this regard, Monkman et al.'s (2018) study revealed that HL is not equivalent to DHL. While participants in Monkman et al.'s study had generally high levels of HL, their scores regarding DHL were much more variable. This finding suggests that HL and DHL can be understood as distinct concepts (Monkman et al., 2018). Furthermore, according to Quinn et al.'s (2017) study examining "the association between HL, DL, and actual online health information-seeking behavior," "eHealth literate individuals may not always utilize effective online searching strategies (p. 256)."

### Discussions and Conclusion

The findings have addressed that it could be a unique concept even though DHL is grounded in digital and health literacies. When comparing DL and HL, DHL requires additional computer, media, and informational skills. In this regard, Monkman et al. (2018) found no relationship between an individual's health literacy and DHL because the skills required for interacting with online materials could be different from those required for engaging with paper materials. Moreover, methodological approaches to digital health and health literacy research should differ (Monkman et al., 2018). Similarly, Quinn et al. (2017) revealed no correlation between HL and DHL. This finding suggests that the existing widespread DHL (e.g., eHEALS) measures individuals' self-efficacy rather than their online health information-seeking abilities (Quinn et al., 2017).

The recent trend of understanding and measuring, emphasizing socioecological aspects of DHL beyond the individual's abilities, indicates that it is necessary to empirically research DHL in various online and offline contexts of different adult populations/distinct groups. In this way, we would identify common and different contextual factors that influence their DHL and obtain clear evidence. Furthermore, the additional features of DHL, different from those of digital and health literacies, require a comprehensive approach to developing educational programs by addressing all core competencies and collaborating among experts from diverse fields such as education, evaluation, digital, and health areas.

For adult education practitioners and community members, having a proper literacy level of DHL has become increasingly important. Especially during COVID-19 and even the post-COVID era, the ability to critically use a vast range of electronic health information is critical, given there is a digital divide phenomenon among adults. The genuine inclusion of marginalized adult populations in DHL could be achieved not by merely providing them more access to digital media/technologies but by offering well-structured training/education that enables them to proactively engage in seeking information, learning, and proper decision-making (UNESCO, 2022). This study's findings contribute to establishing a comprehensive curriculum and programs of DHL for a wide range of adult populations.

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