

# **Decoding the Complexity of Online Health Information: Dynamics between eHealth and Media Literacy**

Hye-Sun Lee, Wonjeong Jeong, Kyounghee Oh, Jae Kwan Jun

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# Decoding the Complexity of Online Health Information: Dynamics between eHealth and Media Literacy

Hye-Sun Lee<sup>1</sup> PhD; Wonjeong Jeong<sup>1</sup> PhD; Kyounghee Oh<sup>1</sup> MS; Jae Kwan Jun<sup>1,2</sup> MD, PhD

<sup>1</sup>National Cancer Control Institute National Cancer Center Gyeonggi-do KR

<sup>2</sup>Graduate School of Cancer Science and Policy National Cancer Center Gyeonggi-do KR

## Corresponding Author:

Jae Kwan Jun MD, PhD  
National Cancer Control Institute  
National Cancer Center  
24, Jeongbalsan-ro  
Ilsandong-gu, Goyang-si  
Gyeonggi-do  
KR

## Abstract

Contemporary online health information is no longer explained using basic reading and writing skills. Individual skills for accessing, understanding, and evaluating online health information are complex and elaborate in the information-rich modern society. Therefore, this paper aimed to provide a viewpoint for understanding the complexity of online health information by illuminating the dynamics between eHealth and media literacy. This viewpoint paper applied the lenses of both eHealth literacy and media literacy to online health information, with the premise that contemporary online health information is health information and media messages. It further discussed media literacy related to online health information more comprehensively, including accessing, analyzing, evaluating, creating, and acting. This paper sheds light on the transition from traditional health literacy to eHealth literacy by focusing on the health information realm. After applying the components of media literacy to online health information, eHealth literacy and media literacy concepts were mapped to eHealth literacy scales associated with online health information. This perspective explains why media literacy should be considered together with health promotion strategies based on eHealth literacy.

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## Original Manuscript

## Viewpoints and Perspectives

# Decoding the Complexity of Online Health Information: Dynamics between eHealth and Media Literacy



## Abstract

Contemporary online health information is no longer explained using basic reading and writing skills. Individual skills for accessing, understanding, and evaluating online health information are complex and elaborate in the information-rich modern society. Therefore, this paper aimed to provide a viewpoint for understanding the complexity of online health information by illuminating the dynamics between eHealth and media literacy. This viewpoint paper applied the lenses of both eHealth literacy and media literacy to online health information, with the premise that contemporary online health information is health information and media messages. It further discussed media literacy related to online health information more comprehensively, including accessing, analyzing, evaluating, creating, and acting. This paper sheds light on the transition from traditional health literacy to eHealth literacy by focusing on the health information realm. After applying the components of media literacy to online health information, eHealth literacy and media literacy concepts were mapped to eHealth literacy scales associated with online health information. This perspective explains why media literacy should be considered together with health promotion strategies based on eHealth literacy.

**Keywords:** eHealth literacy; media literacy; online health information; internet; public health; health communication

## Introduction

The Internet has been the foundation for seeking health information online anytime and anywhere. With the rapid expansion and widespread adoption of the internet, healthcare professionals are encountering an increasing number of patients who are well-informed using online sources [1]. For patients and media users, it is necessary to increase the accuracy and comprehension of the information received. The Internet has evolved into a vital source of health-related information, covering topics ranging from lifestyle habits to common illnesses and professional medical knowledge [2]. Although the Internet has traditionally served as a one-way health communication channel, the concept of participative Internet has gained traction owing to the rise of social networking, enabling multi-way conversations about health [3].

In the healthcare field, Internet usage is intertwined with social inequality. Health information has already been acknowledged as a means of enhancing resources, and recent studies have shed light on who benefits the most and how within interconnected communities [4]. However, the proliferation of online health information can have both positive and negative consequences. For instance, in the context of cancer, accessing online resources enhances awareness and encourages screening; however, this information may not be scientifically verified and can exacerbate anxiety and health concerns [2]. An urgent response is

warranted because the accurate assessment and enhancement of health information are directly linked to well-being. Assuming that online health information is health information that has been moved from printed materials to an online environment would be incorrect. This is because contemporary online health information may not be fully comprehensible from the traditional health or eHealth literacy perspectives [5]. Therefore, more elaborate perspectives are required to understand the complexity of online health information.

This viewpoint paper illuminates the dynamics between eHealth and media literacy to understand the complexity of online health information. It begins with the premise that online health information comprises both health information and media messages. Previous studies have suggested a relationship between eHealth and media literacy in two ways: the first is the view that media literacy is a core skill for eHealth literacy [6], and the second is merging the two concepts (e.g., media health literacy) [7]. These studies have common limitations that highlight the concept of partial media literacy, especially in relation to critical thinking. This paper focused on online health information using both lenses: eHealth literacy and media literacy. It closely examined the dynamics between health, eHealth, and media literacy regarding online health information, and applied and mapped the concepts of eHealth and media literacy to eHealth literacy measurement tools. Based on this perspective, we suggest that both the eHealth and media literacy perspectives should be considered when encouraging health promotion using online health information.

### From Health to eHealth Literacy

Health literacy has been defined in various studies and the scope and depth of the field have expanded. In the 1990s, the American Medical Association's Ad Hoc Committee on Health Literacy [8] defined health literacy as "the constellation of skills, including the ability to perform basic reading and numerical tasks required to function in the healthcare environment". This definition emphasizes the necessary skills for reading and understanding health materials such as patient education brochures and consent forms. Furthermore, it views patients' health literacy and their ability to act on healthcare information. Health literacy also appears in the health promotion glossary [9,10], and it was defined as "the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand, and use information in ways which promote and maintain good health" [9]. This indicates personal skills or confidence in taking action to promote personal and community health, such as reading health-related pamphlets, making appointments with doctors, understanding food labels, and complying with prescribed actions [11]. However, health literacy does not simply mean the possibility of specific health-related behaviors [9]. It is critical to access, understand, and assess health information and resources. By effectively dealing with health information, health literacy plays a crucial role in engaging and

empowering people to make health promotion decisions [10].

Health information is an essential element of health literacy [12]. Numerous studies have stated that health literacy is related to accessing, understanding, and evaluating information that affects health-related decisions [5,13-17]. The subdomains divided into various aspects of health literacy also highlight skills, knowledge, ability, and capacity to access, understand, and evaluate health information. For instance, basic or functional literacy refers to the fluency of reading and writing skills required to function in a healthcare environment [16]. Another study referred to this as health-related print literacy, which is associated with the ability to understand written health information [13]. In addition to basic or functional literacy, literacy associated with communication has been suggested as another subdomain of health literacy [13,16,18]. This domain encompasses extracting and applying health information and deriving meaning from it regardless of its communication form or changing circumstances [16]. The complexity of health materials is no longer explained solely by basic reading or writing skills in the 21<sup>st</sup> century. Understanding how health information is interpreted requires a comprehensive understanding of the power of communication and the impact of media [5]. This background provides a foundation for the evolution of health literacy to eHealth literacy.

Norman and Skinner [6] defined eHealth literacy 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”. It was derived from the definition of health literacy; however, eHealth literacy emphasizes that modern health information is primarily delivered through media or mediated sources in an online environment. In this context, eHealth refers to the use of information and communication technologies related to health information [19]. Information and communication technology, in particular, may be a tool for expanding, assisting, or enhancing health promotion activities [20]. However, Norman and Skinner [6] suggested that there is a gap between the ability to use information and communication technologies and eHealth literacy. For example, some people may have difficulty accessing, discerning, and evaluating online health information, even if they feel comfortable using the Internet [21]. There may be different evaluations and perceptions of the quality of online health information or sources based on eHealth literacy levels regardless of educational level [22].

### **eHealth and Media Literacy**

Norman and Skinner [6] suggested the eHealth literacy model, which comprises six core literacy skills: traditional, health, information, science, media, and computer literacy. This model mentions media literacy



as a fundamental and analytical skill for online health information and explains that media literacy plays a critical role in media, media messages, and sources as delivered. However, critical thinking is only a part of media literacy, an extensive area that includes access, analysis, evaluation, creativity, and acts related to media messages.

Media literacy is “the ability of a citizen to access, analyze, and produce information for specific outcomes” [23]. The analysis includes different meanings, such as decoding or evaluating, and the information covers bare symbols to different forms of media developed in human history. Livingstone [24] defined media literacy as “the ability to access, analyze, evaluate, and create messages in various forms.” In particular, the five components (access, analysis, evaluation, creation, and act), which utilize all forms of communication are pillars of the media literacy concept [25-28]. These five pillars or components are used in different ways when dealing with online health information. For instance, they require effective health information retrieval and communication tool usage strategies to complete health-related tasks online [29]. This requirement can apply an access component, which means skillfully using media and technological tools [27]. As a component of media literacy, analysis relates to interpreting and decoding skills for media and media messages [24]. The analysis can be mentioned together with the evaluation component, which is the assessment following quality criteria or standards [30]. Furthermore, critical thinking can be applied to these two components to analyze media messages and evaluate their credibility, quality, and veracity [27].

eHealth and media literacy enter a complex dynamic in the context of analysis and evaluation. There should be a focus on the purpose of each literacy skill to gain a detailed understanding of these complex dynamics. eHealth literacy highlights online information for health promotion, whereas media literacy focuses on information as a media message. Therefore, in the context of analysis and evaluation, the eHealth Literacy Scale (eHEALS) measures skills to evaluate health resources on the Internet [31]. However, the media literacy scale analyzes the positive and negative effects of media messages and makes decisions about their accuracy or credibility [32]. This does not suggest exclusivity between the two concepts, and ironically, this difference explains why eHealth and media literacy are in parallel relationships in the virtuous cycle. For example, cancer society websites and Google are frequently utilized resources by individuals with cancer seeking online information [33]. Patients can search for helpful online health information on Google regardless of whether they evaluate Google as a helpful resource for their health. In this situation, patients extract online health information from media messages, such as posted articles and excerpted sentences from another resource. Media literacy plays a role in

decoding media messages into health information, and the evaluation component applies to decision-making regarding the credibility, quality, and veracity of media messages. Conversely, patients evaluate cancer society websites as helpful resources for health promotion. However, they need to analyze and evaluate each message before deciding whether the health information in the messages exposed through cancer society websites is helpful. If a specific resource continuously provides online health information with accurate and credible media messages (media literacy), it can be perceived as helpful for health promotion (eHealth literacy).

As a crucial component of media literacy, the creation aspect involves composing and generating content, whereas the action component pertains to sharing knowledge and problem solving with others or the community [27,30]. Norman and Skinner [6,31] did not emphasize sharing online health information or generating content in their eHealth literacy model because they highlighted critical thinking as a media literacy role. However, the creation and action components of media literacy are worth considering in eHealth literacy because the radius of using online health information has expanded from acquisition to sharing. For instance, people use the Internet to search for health information for someone else, such as when seeking online health information for health promotion [34]. During infectious disease outbreaks, such as COVID-19, individuals select friendly media resources to obtain information, often sharing health information with older family members or others [35]. A previous study called fundamental interpersonal communication skills about health with strangers or close others communicative eHealth literacy [36]. However, in the Web 2.0 context, a two-way communication environment, people construct media messages, including health information, and post them online. They use social media platforms to share health information or express their concerns [3,37]. Additionally, people have the opportunity to post narrative content about their experiences with cancer diagnosis or proactive problem-solving related to cancer [38]. In line with this context, eHEALS, the measurement tool for eHealth literacy, is divided into multiple sub-factors, such as information awareness, seeking, and engagement [3]. This implies that discussions on eHealth literacy need to be expanded for consideration in Web 2.0 environment [39].

### **eHealth Literacy Scales and Media Literacy**

The relationship between eHealth and media literacy does not imply that the two concepts can be merged or integrated. These concepts have overlapping and unique areas concerning online health information derived from media messages. The positive relationship between eHealth and media literacy is evidence of overlapping zones between the concepts [40-42]. A previous study [40] reported a positive correlation with a coefficient of 0.3 between eHealth and media literacy. In other words, eHealth and media literacy

overlapped, as explained by the positive correlation coefficient. However, this also indicates that each concept has unique areas that cannot be accounted for by correlations alone.

Previous studies focusing on eHealth and media literacy have provided insights into the overlapping zones and unique areas of the two concepts. For instance, prior studies that found positive relationships between eHealth and media literacy focused on limited areas of media literacy, such as understanding, knowing, deliberate choices, critical views, and analyzing health-related media messages [40-42]. These findings suggest that critical thinking and analysis of media messages are relevant to the overlapping zone between eHealth and media literacy. eHealth literacy aims to address or solve health problems [6]. For instance, regarding treatment options, considering self-health conditions, identifying reliable sources, and assessing information quality are tasks related to eHealth literacy [29]. Therefore, analyzing and evaluating information or knowledge in the context of health promotion corresponds to a unique area of eHealth literacy. Creation and acting are unique areas of media literacy because earlier discussions on eHealth literacy have not mentioned these components [6,31]. However, another study suggested that crafting media messages and acting on health-related issues based on media messages could enhance health literacy [43]. These perspectives indicate that unique areas such as the creation and action components of media literacy are not wholly isolated from eHealth literacy.

In this context, the eHEALS can be mapped to media literacy components. Table 1 shows the mapping between eHEALS developed by Norman and Skinner [31] and the media literacy components. The first item of eHEALS focuses on finding helpful resources on the Internet and correlates with online health information acquisition, skills, awareness, and seeking within eHealth literacy [39]. This item can be applied to the access components of media literacy as it measures the skillful use of the Internet, a technological tool. Analyzing and evaluating media messages delivered by a resource is required to assess whether specific health resources on the Internet are helpful. Therefore, this item can also be applied to analysis and evaluation components. On the eHEALS scale, the seventh item focuses on telling the quality of health resources on the Internet, whereas the eighth item assesses feeling confident about making decisions using health information online. These items exhibit lower factor loadings than others [31] and have been grouped into another subfactor along with the sixth eHEALS item in several studies [39]. Prior studies named the sub-factor (including three items), “information application” or engagement [44,45]. However, when considering media literacy, these three items are related to the act component associated with knowledge sharing and problem-solving.

Table 1. Mapping the eHEALS items on media literacy components

Media Literacy Components	Access	Analysis & Evaluation	Creation	Act
Items	skillful use of media or technological tool	analyzing/evaluating media messages and resources	composing and generating message	sharing knowledge and solving problems with others or the community
I know how to find helpful health resources on the Internet.	Be applicable	Be applicable	Lack of applicability	Lack of applicability
I know how to use the Internet to answer my health questions.	Be applicable	Be applicable	Be applicable	Lack of applicability
I know what health resources are available on the Internet.	Be applicable	Be applicable	Lack of applicability	Lack of applicability
I know where to find helpful health resources on the Internet.	Be applicable	Be applicable	Lack of applicability	Lack of applicability
I know how to use the health information I find on the Internet to help me.	Lack of applicability	Be applicable	Be applicable	Lack of applicability
I have the skills I need to evaluate the health resources I find on the Internet.	Lack of applicability	Be applicable	Lack of applicability	Be applicable
I can tell high quality from low quality health resources on the Internet.	Lack of applicability	Be applicable	Be applicable	Be applicable

Media Literacy Components	Access	Analysis & Evaluation	Creation	Act
Items	skillful use of media or technological tool	analyzing/evaluating media messages and resources	composing and generating message	sharing knowledge and solving problems with others or the community
Internet.				
I feel confident in using information from the Internet to make health decisions.	Lack of applicability	Be applicable	Lack of applicability	Be applicable

The Health Information National Trends Survey (HINTS) is also a useful scale for measuring eHealth literacy [46]. This scale focuses on the use of publicly available cancer-related information use. However, the data from this scale also included two sections that measure information opportunities in health: looking for health information and using the Internet to find information [47]. In the looking for health information section, four items describe the difficulty in searching for cancer information online. These four items ask about requiring effort, feeling frustrated, being concerned about information quality, and hardly understanding information when searching for cancer information online. eHealth and media literacy should be considered together to enhance respondents' ability regarding these items. For instance, if respondents feel frustrated or perceive that they require more effort than anticipated when searching for cancer information online, the difficulty can be divided into two categories: searching for information and cancer (or health) information online. Individuals may need help to search for online information regardless of the context of health information or health promotion. Conversely, as mentioned earlier, they could also have trouble searching for health information even despite feeling comfortable searching for information online [21].

Table 2 indicates the difference when applying eHealth and media literacy to the eHealth literacy scales in HINTS 6 items. These items are considered in terms of both eHealth and media literacy because they focus on online health information from media messages. However, the primary purpose of literacy differs in this context. For instance, when sharing general health-related information (such as news articles) on social media, media users or patients play two roles: the first involves delivering or spreading health information that influences health-related decision-making (from the perspective of eHealth literacy), whereas the second entails creating and constructing media messages containing online health information (from the media literacy perspective). The co-occurrence of these two roles is associated with the relationship between eHealth and media literacy. Media users publish health-related messages while obtaining health information online. When handling online health information, media users engage in openness and collaboration, contact information sources directly, and do not need gatekeep [48]. The various dynamic roles associated with eHealth and media literacy pertain to a broadened scope of engagement with health information on media users, including patients. Just as it is nearly impossible to separate media users from patients, individuals' eHealth and media literacy mutually influence each other when utilizing online health information.

Table 2. Applying the eHealth and Media Literacy to the HINTS items

Concepts	eHealth Literacy	Media Literacy
Items	the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to address or solve a health problem	the ability to access, analyze, evaluate, create, and act on media messages in various forms
It took a lot of effort to get the information you needed.	Effort is needed for health information, not general online information.	Effort is needed for online information, including health or medical information.
You felt frustrated during your search for the information.	They felt frustrated while searching for health information, not general online information.	They felt frustrated when searching for online information regardless of the health or medical context.
You were concerned about the quality of the information.	They were concerned about the quality of the information under health promotion or medical context.	They were concerned about the quality of the online information derived from the media message (i.e., validity, reliability, and veracity).
The information you found was hard to understand.	They understand general online information easily but find it difficult to access health or medical information.	They find it challenging to understand general online information or extract information from media messages.
How confident are you that you can find helpful health resources on the Internet?	They have confidence in general tasks but need more confidence in health resources.	They need more confidence to find helpful resources on the Internet, regardless of their health or medical context.
Would you be willing to share health data from your wearable device with your family or friends?	They are willing to share health data for decision-making for health promotion.	As the sender of a media message, they are willing to share health data to communicate or interact with their family or friends.

Concepts	eHealth Literacy	Media Literacy
Items	the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to address or solve a health problem	the ability to access, analyze, evaluate, create, and act on media messages in various forms
Visited a social media site.	They evaluate social media sites as helpful health resources on the Internet.	They evaluate social media sites as a field for communication and interaction with others, including within health or medical contexts.
Shared personal health information on social media.	They share their health information on social media to make decisions regarding their health promotion.	They are the sender and receiver of media messages on health-related social media sites and participate in health-related communities online.
Shared general health-related information on social media (for example, a news article).	They share general health-related information for decision-making regarding their health promotion.	As the sender of media messages on social media, they construct and deliver their media message, including general health-related information. Further, they understand the effects of their media message, including health-related information.
Interacted with people who have similar health or medical issues on social media or online forums.	They interact with people for their health promotion and can apply the knowledge gained to address or solve a health problem.	They are the sender and receiver of media messages while interacting with people. Sometimes, they solve health-related problems for others at the community, local, and regional levels through social media or online forums.
Watched a health-related video on a social media site (for example, YouTube).	They watched a video to seek, find, understand, and appraise health information in the context of health-related problem-solving.	They watched a video, a type of media message, and can access, analyzing, evaluating, and acting to health-related video on social media sites.



Concepts	eHealth Literacy	Media Literacy
Items	the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to address or solve a health problem	the ability to access, analyze, evaluate, create, and act on media messages in various forms
I find it hard to tell whether health information on social media is true or false.	They need more help deciding whether health information is true or false under medical or health promotion contexts (e.g., this health information would be helpful to others but could not apply to my health-related problem).	They need more help deciding whether the media message is true or false, considering validity, reliability, and veracity (e.g., “Could we verify the evidence to ensure health information?”).
Most of the people in my social media networks have the same views about health as me.	They might exchange similar health information and make similar decisions regarding their health-related problems.	They might analyze, evaluate, and act similarly on media messages, including health information. By reflecting the same views, they could construct and deliver similar health-related media messages within social media networks.

## Conclusions

Health information and literacy concepts have developed following the field of information for health promotion. The traditional perspective on health literacy transacted to eHealth literacy as the realm of health information expanded to the online environment. Although the concept of health literacy has continuously evolved, a gap remains in the explanation of the complex dynamics of online health information in contemporary society. We believe that online health information includes both health-related information and media messages. Furthermore, both eHealth and media literacy can offer valuable insights into the complex dynamics of online health information. These two concepts share a common interest in empowering patients or media users in online health-promotion. Health promotion strategies for the public could encourage both eHealth and media literacy to deal elaborately with online health information with complex dynamics and to make health promotion decisions.

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## Conflict of Interests

The authors have no known conflict of interest to disclose.

## Abbreviations

eHEALS: eHealth Literacy Scale

HINTS: Health Information National Trends Survey

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