

Digital Literacy: Definition, Theoretical Framework, and Competencies

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Abstract: This paper offers an overview of existing definitions and theoretical frameworks for digital literacy. The researcher makes recommendations for an agreed upon definition and theoretical framework and discusses implications for a relationship between digital and visual literacy skills.

For some time now, new perspectives on literacy, and the learning processes through which literacy is acquired, has been emerging (Herbert, 1991). While there is agreement that a new set of 21st-century skills involving technologies are needed for literacy, there is little consensus about precisely what knowledge and abilities are necessary for people to be digitally literate (Ba, Tally, & Tsikalas, 2002). To obtain a consensus, there must be an agreed upon definition for digital literacy and an identification of its particular competencies. For this to happen, two initial steps must be taken: (a) Begin the development of an instrument designed to identify the major dimensions of digital literacy, and (b) conduct an initial validation study of this instrument. This paper offers an overview of existing digital literacy definitions, frameworks, and competencies; makes recommendations for the refinement of a digital literacy model that includes visual literacy as a core skill; and discusses implications for a relationship between digital and visual literacy skills.

Purpose

As technology pervades every aspect of our lives, the ability to navigate and successfully accomplish tasks through technology grows. Whether you are in primary, secondary, or post-secondary school, and whether you are employed or entering retirement, it is now necessary to have some technology skills both to communicate with the outside world and to perform administrative, creative, and educative tasks. The continued increase and use of online media content for information gathering also challenges the learner to organize and compose information in a nonlinear fashion while often integrating visual media to synthesize that information. This skill set is commonly called digital literacy. Digital literacy refers to the assortment of cognitive-thinking strategies that consumers of digital information utilize (Eshet, 2004). Other terms used alongside or sometimes synonymously with digital literacy include: 21st-century literacies, Internet literacies, multiliteracies, information literacy, information communication technologies (ICT) literacies, computer literacy, and online reading comprehension (ORC). Each term has particular definitions, but common assumptions bring them together under the same theoretical umbrella of new literacies.

Leu, Zawilinski, Castek, Banerjee, Housand, Liu, and O'Neil (2007) conclude that most new literacies, including digital literacy, share four assumptions: (a) new literacies include the new skills, strategies, dispositions, and social practices that are required by new technologies for information and communication; (b) new literacies are central to full participation in a global community; (c) new literacies regularly change as their defining technologies change; and (d) new literacies are multifaceted and our understanding of them benefits from multiple points of view. Leu, O'Byrne, Zawilinski, McVerry, and Everett-Cacopardo (2009) describe how new

literacies theory can function on two levels—upper case (New Literacies) and lower case (new literacies). Digital literacy acts as a lower case dimension to the broader more inclusive concept of upper case New Literacies. Research conducted in the various lower case fields such as digital literacy, information literacy, or online reading comprehension inform the larger field of New Literacies.

Ba and colleagues (2002) offer a broad definition of digital literacy. They describe digital literacy as a “set of habits through which youngsters use information technologies for learning, work, and fun” (p. 5). This definition is general, but sheds light on a key paradox in contemporary education; that is, the skills demanded for an increasingly technological and changing work-place are not being learned in school, but rather outside the sphere of the school environment (Beavis, Apperley, Bradford, O'Mara, & Walsh, 2009). As the Internet has become this generation’s defining technology for literacy and learning, classrooms have yet to take up Internet integration into the classroom or begin instruction in the new literacy skills the Internet requires (Leu et al., 2007). Currently, according to the International Association for K-12 Online Learning, Idaho, Alabama, Florida, and Michigan require students to take online education courses to graduate.

In light of this, policymakers must begin to recognize the pervasive growth of the Internet in education, work, and home settings as a reading comprehension (cognitive) issue, not just a techno-procedural one. Currently, no state in the United States measures students’ ability to read search engine results during state reading assessments, to critically evaluate information that is found online to determine its reliability, to compose clear and effective email messages, or to permit all students to use a word processor on the state writing assessment (Leu, Ataya, & Coiro, 2002). In 2009 the National Assessment of Educational Progress (NAEP), known as our nation's report card, excluded online reading comprehension from the 2009 NAEP reading framework. The *digital divide* between school, home, and the workplace is highly problematic, creating a discord between the learning experiences in each environment. Educators need to correlate students’ digital literacy habits from their personal lives with instructional practices in school (Leu et al., 2011). This correlation will begin to address the disconnect that exists between home and school technology use and make curriculum more relevant to student’s lives.

The purpose of this paper is to illustrate the need for researchers and educators to agree upon a digital literacy theoretical framework and its accompanying competencies. This will permit educators to design curriculum that is effective at teaching digital literacy skills.

Literature Review Methodology

The author queried numerous databases including ERIC, ProQuest, EBSCOhost, FirstSearch, and Google Scholar using the terms: 21st century literacies, Internet literacies, digital literacies, new media literacies, information literacy, ICT literacies, computer literacy, and ORC (online reading comprehension). Bibliographies of relevant articles served as a source of content for the review as well. The author highlighted material available in English and published within the last 8 years. The author expanded his search to include information literacy mission statements for colleges and universities across the nation. Digital literacy theoretical frameworks and information literacy mission statements and/or frameworks were analyzed for commonalities and differences. The author synthesized these various approaches and made suggestions for the development of a digital literacy framework and its competencies and suggests implications for a relationship between digital and visual literacy skills.

Definitions and Frameworks

Primary, secondary, and post-secondary schools have arrived at definitions of information literacy through their library systems. Presently, most institutions use a definition of information literacy that focuses on research skills such as posing a question, identifying appropriate sources, finding, evaluating, or synthesizing information, or using it in a product (American Association of School Librarians, 1998). Information literacy has a history of focusing on such research skills, but as a result of changing and evolving technology use, this research model needs to be expanded to a more holistic definition that includes more competencies and be re-defined as digital literacy.

The Florida Department of Education (Florida Dept. of Education, 2005) developed the FINDS research process model as a framework for its information literacy curriculum standards for media specialists. The FDOE has broken the research process model up into five overarching themes: focus, investigate, note, develop, and score. All of the indicators in this framework are important skills, but are limited to the finding, retrieval, and synthesis of information in a research context. Following in this vein, the 2011 Florida International University Library Instruction Program Information Literacy Vision Statement asserts that “the libraries seek to promote information literacy by educating students to understand the organization of knowledge, gather data of all kinds using both print and information technology resources, and evaluate the relevance and authority of information in all its forms” (para. 4). The 2011 Hunter College of New York Information Literacy Mission Statement asserts:

Information literacy enhances the pursuit of knowledge by preparing students to think critically and use information for their academic, professional and personal lives. The information literate individual can recognize the need for information, can locate it using a variety of media and technologies, and can evaluate information in order to use it effectively. Information literate students have the flexibility to take these skills from their formal education and use them throughout life as citizens and professionals and as a means toward continued learning. (para. 4)

This is another example of a research-based focus, though Hunter College does address the bridge between technology use in school, work, and the home.

Libraries have been leaders in defining information literacy at schools because their environments have been in the forefront of the transition from printed text to digital text. Unfortunately, a focus on research competencies as a core framework does not encompass the full set of skills that can make a student fully successful in a digital environment. Following are definitions for digital literacy that not only encompass the important capacity for research skills but also include concepts of visual and media literacy, non-linear thinking, and collaborative/socio-emotional skills. The 2011 Association of Colleges and Research Libraries, American Library Association states that

Information literacy is 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. Information literacy also is increasingly important in the contemporary environment of rapid technological change and proliferating information resources. In addition, information is available through multiple media, including graphical, aural, and textual, and these pose new challenges for individuals in evaluating and understanding it. (para. 3)

The inclusion of graphical, aural, and textual elements that pose new challenges for individuals in evaluating and understanding addresses the issue of new additional skills that are necessary for consideration when defining information literacy.

The University Library at the University of Illinois at Urbana-Champaign uses a broad definition of digital literacy stating that digital literacy is (a) the ability to use digital technology, communication tools or networks to locate, evaluate, use and create information; (b) the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers; and (c) a person's ability to perform tasks effectively in a digital environment. Literacy includes the ability to read and interpret media, to reproduce data and images through digital manipulation, and to evaluate and apply new knowledge gained from digital environments (University of Illinois, 2011, para.1).

The University of Illinois' definition also goes beyond the finding, retrieval, and synthesis of information. The third bullet from the above definition mentions concepts of images, reproduction, and digital manipulation as parts of digital literacy. This broader view takes into account that a computer is a graphic interface that often gives information, directives, and cues not just with text but also with images and symbols that need to be deciphered. One can make the argument that to be digitally literate one must also be visually literate (Jones & Flannigan, 2006). It is important to begin to acknowledge the fact that digital media represents cultural forms that are inextricably connected with other visual and audio-visual media (Buckingham, 2007). The continued use of computers and other digital media places a strong emphasis on not only visual literacy, but media literacy skills as well when considering the skills needed to become digitally literate. Current media literacy frameworks can serve as a good foundation for the development of a digital literacy framework.

The United Kingdom Office of Communications (Ofcom, 2006) defines media literacy as "the ability to access, understand and create communications in a variety of contexts" (p. 7). Media literacy as defined by Ofcom (2006) and broadened by Buckingham (2007) indicates some of the issues that might be addressed in applying this framework to the World Wide Web to create a digital literacy framework. For Buckingham (2007),

approaching digital media through media education is about much more than simply 'accessing' these media, or using them as tools for learning: on the contrary, it means developing a much broader critical understanding, which addresses the textual characteristics of media alongside their social, economic and cultural implications. (p. 49)

In response to these trends in research, Eshet-Alkalai (2004) created a five-skill holistic conceptual model for digital literacy. This framework, expanded in 2009 to include six skills, offers a useful way to begin creating assessment tools that can be used to increase research and better understand what core skills are representative of effective digital literacy. Eshet-Alkalai and Chajut's (2009) framework consists of the following skill sets:

- Photovisual literacy is the ability to work effectively with digital environments, such as user interfaces, that employ graphical communication.
- Reproduction literacy is the ability to create authentic, meaningful written and artwork by reproducing and manipulating preexisting digital text, visuals, and audio pieces.
- Branching literacy is the ability to construct knowledge by a nonlinear navigation through knowledge domains, such as in the Internet and other hypermedia environments.
- Information literacy is the ability to consume information critically and sort out false and biased information.

- Socioemotional literacy is the ability to communicate effectively in online communication platforms such as discussion groups and chatrooms.
- Real-time thinking skill is the ability to process and evaluate large volumes of information in real time, such as in computer games and chatrooms.

The definition for photo-visual literacy created by Eshet-Alkalai (2004) is limited and should be expanded to include a set of abilities that enables an individual to effectively find, interpret, evaluate, use, and create images and visual media. This broadened definition addresses the role images play in the conveyance of information in the digital age and the need to synthesize that information visually as stated in the reproduction literacy definition above.

Eshet-Alkalai (2004) concludes that digital literacy is more than the ability to use software or operate a digital device; it includes a large variety of complex cognitive, motor, sociological, and emotional skills. This shapes his framework into a holistic tool that includes three strands: technical-procedural, cognitive, and emotional-social skills (Aviram & Eshet-Alkalai, 2006). Eshet-Alkalai (2004) states that the

technical-procedural refers to basic computing skills necessary to operate technology using modern graphic interfaces; surfing the Web in non-linear ways, cognitive deals with pedagogy issues when considering digital literacy such as comprehension, critical reflection, and creativity while emotional-social skills is concerned with the social media aspect of computing in contemporary society. (p. 94)

This holistic view of digital literacy recognizes that the use of technology, specifically the Internet, is a reading comprehension issue, not just a techno-procedural one. Eshet-Alkalai (2004) proposes to use this theoretical framework as a diagnostic and evaluative tool for use in creating precise, user-directed products.

Eshet-Alkalai arrived at this theoretical model from a study in 2002. In order to investigate various aspects of digital literacy, three groups of participants were selected that included ten high school students, ten college students, and ten adults. All participants were given assignments that required performing the ability to use different kinds of digital literacy skills. For example, to measure branching literacy, participants were asked to plan a trip to a foreign country by using information from the Internet. The tasks were assessed through observation and the completion of rubrics by observers. Because of the small sample used in this group and the qualitative methods used for analysis, it is difficult to infer results to a larger population. These limitations can be addressed through further research attempts using this theoretical model.

Implications

Recent work by Leu et al. (2008) suggests that online reading comprehension is not isomorphic with offline reading comprehension. The technology that exists today has brought about a number of important shifts of emphasis in terms of literacy (Merchant, 2007). One of the most critical and obvious is a move from fixed to fluid texts where reading and writing paths have become non-linear in contrast to linear historical texts. Furthermore, the increase in leaner use of online media content for information gathering challenges the learner to organize and compose information in a nonlinear fashion while often integrating visual media to synthesize that information. These shifts pose new challenges for individuals in evaluating and understanding information and necessitate additional skills for effective literacy.

Eshet-Alkalai's (2004) definition of digital literacy and a hybrid of the five-skill holistic conceptual model can be used gain consensus creating assessment tools that can be used to increase research and better understand what core skills are truly representative of effective

digital literacy. Only through continued research can we come to a consensus on what those demands and skills are and begin to develop assessments of digital literacy skills that are reliable, valid, and easy to score. Researchers must then consider how an understanding of the range of skills that comprise digital literacy might be useful to the learning of literacies in educational settings. Educators, curriculum writers, and policymakers can then begin making the necessary adjustments to literacy curricula taught within schools.

Conclusion

Technology growth and evolution has brought about a number of important shifts of emphasis in terms of literacy over the past two decades. One of the most critical and obvious is a move from fixed to fluid texts where reading and writing paths have become non-linear in contrast to linear historical texts (Merchant, 2007). Other shifts include the development of interwoven texts through the use of such devices as textual hyperlink, reading and writing paths that are becoming non-linear, and text that has become more densely multimodal (Merchant, 2007). These shifts pose new challenges for individuals in evaluating and understanding information and necessitate additional skills for effective literacy. These shifts also offer evidence that online reading must be considered a new form of literacy with its own set of demands and skills that are both techno-procedural and cognitive in nature.

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