

# Critical Information Literacy in the Geographic and Information Sciences



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## INTRODUCTION

Literacy in today's print and online environments has many elements. As librarians, we cover the waterfront, so to speak, from information literacy, prose literacy, document literacy, and quantitative literacy. Critical information literacy places the emphasis less on information seeking skills and more on how literacy is a situated socially constructed event. If librarians move toward a critical theory model of literacy, what does this mean for geographic information librarians? The core competencies for geographic information librarianship advocate considering theoretical, technical, and social perspectives when preparing information services in support of geographic information related research and study endeavors. (Weimer, Andrew, & Hughes, 2008, p. 10) This perspective is especially needed as the application of geospatial tools has become more common in a variety of applied research functions in several disciplines. This article explores critical theory as posited in the discipline and practice of geographic information science, with a particular view of the social construction of knowledge and knowledge behaviors. One of the issues involved in the examination of GIS is defining what is meant by the term GIS. GIS ranges from geographic information systems (GIS) to geographic information science (GIScience) to geographic and information science (G&IS). The umbrella of GIS is very large and beyond the intent of this article. We examine in this article the construction of information literacy within critical theory in GIScience and G&IS.

## BACKGROUND

Traditionally, *literacy* is defined as the ability to read, write coherently, and think critically. From a global perspective, UNESCO (2005, p. 21) defines *literacy* as "the ability to identify, understand, interpret, create, communicate, compute, and use printed and written materials associated with varying contexts." Literacy is defined further as a *continuum* of learning, which allows individuals to fully participate in society (UNESCO, 2005). Hence, there is the expectation of a contextualized and situated knowledge based on what an individual needs to be considered literate in his or her society.

New forms of literacy continue to further expand the traditional notion of literacy. In 2003, the National Assessment of Adult Literacy (NAAL) examined three types of literacy: (1) prose literacy; (2) document literacy; and (3) quantitative literacy (Kutner et al., 2007). Prose literacy deals with how one understands whole works, such as articles and book chapters, while document literacy deals with parts of texts, such as maps and tables. Quantitative literacy (numeracy) is the ability to work effectively with numbers and other mathematical concepts. Included in quantitative literacy is statistical literacy, which is the ability to read and interpret summary statistics in the everyday media. Other literacies include social-structural literacy, research literacy, and publishing literacy, which respectively address how information is socially situated and produced, how tools are used to conduct research, and the processes of publication and production of research results.

Tool and resource literacy is the ability to use print/electronic resources and software/hardware and to understand their form, format, and access issues. Spatial literacy is defined as a “state reached through the practice of spatial thinking” and that it is “a continuum, in which expertise develops as part of a process” (Jarvis, 2011, p. 294). There is also an emerging technology literacy, which addresses the adaptation, adoption, and evaluation of information technology in terms of intellectual and social capital and relative costs/benefits of use. These definitions of literacy hinge upon skills to accomplish discrete tasks.

The many types of literacies and their corresponding measures of skills and competencies are the foundation of information and critical literacies, which bridge the educational process and the politics of literacy. In the United States, the most widely known definition of information literacy is from the American Library Association (ALA, 2000), which emphasizes behaviors related to specific measurable skills. Information literate users successfully perform four tasks: recognize when information is needed, locate the needed information, evaluate the suitability of retrieved information, and effectively and appropriately use the needed information. Its emphasis is on behaviors related to specific measurable skills (ALA, 2000).

Behaviors, skills, and competencies also play a part in critical literacies. In their definition of critical literacy, Anderson and Irvine (1990, p. 82) argue that learning to read and write is “part of the process of becoming conscious of one’s experience as historically constructed within specific power relations.” In Elmborg’s (2006) critical information literacy model, he stresses the importance of applying methodologies from literacy theory to examine and question accepted definitions and notions about information literacy.

GIS literacy is defined as measurable task-oriented competencies regarding data and format parameters using a geographic ontology (Jablonksi, 2004; Kimsey & Cameron, 2005). Critical geographic and information sciences literacy geographic information system (GIS) technology and principles using a framework drawn from a larger multi-disciplinary approach, incorporating social theory, science and technology studies, and philosophy (Schuurman, 2006).

Accordingly, the context (how it will be used), content (necessary knowledge), and cognitive/affective processes (such as adaptive reasoning, which link content and context, and procedural fluency) are essential to an understanding of literacy (Hanson & Levin, 2012).

We suggest that a larger social construction framework is essential in the adoption and implementation of critical literacy in academia, especially in a niche area such as geographic information science.

## The Social Construction of Information and Literacy

Critical theory seeks to emancipate human beings from the practices and policies that enslave them (Horkheimer, 1982). However, Crampton and Krygier (2006, p. 13) remind us that

*A critique is not a project of finding fault, but an examination of the assumptions of a field of knowledge. Its purpose is to understand and suggest alternatives to the categories of knowledge that we use. These categories (i.e., assumptions and familiar notions) shape knowledge even as they enable it. ... Critique does not seek to escape from categories but rather to show how they came to be, and what other possibilities there are.*

Hence, critical theory is explanatory, practical, and normative in its examination and critique of society. It uses descriptive and normative bases. Descriptive bases are defined as “what X is.” Normative bases are defined as “what X should be.” However, how do we know what X is or should be? We *know* because we construct our individual understanding of reality through our social interactions with others. The phrase *social construction* comes from Berger and Luckmann’s (1966) monograph entitled *The Social Construction of Reality*. In it, they suggest humans create their own environment through language, which humans produce and reproduce in social practices and everyday encounters.

Bartesaghi and Cissna (2009) remind us that the act of communication is constitutive and consequential. It is constitutive in that it is something created in its very practices. It is consequential in that individuals engage in continuous negotiation and renegotiation of the production of meaning and shared understandings. If we extend this discussion to the social construction of literacy, there are a number of ways to view what constitutes literacy from geographic and information perspectives.

Using social construction as an overarching critical theory, not only is social reality emergent and patterned in talk (Garfinkel, 1967; Sacks, 1985), knowledge is culturally and historically contextualized (Gergen,

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