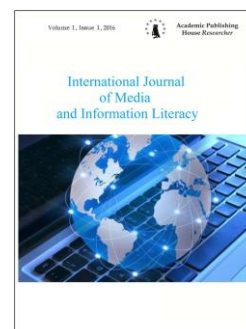


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Reflections on Information Literacy

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Abstract

Information Literacy is an emerging discipline that operates according to a set of principles and strategies that enable individuals to make sense of the information we are exposed to on an ongoing basis. This discipline, which is defined as *the ability to access and assess information*, provides a framework that facilitates the discussion of Information with others—including children, peers, and the people responsible for the presentation of information. The paper identifies points of convergence with Media Literacy but makes the point that they remain distinct areas of study. The paper also identifies a series Lines of Inquiry that distinguishes this important discipline.

Principle #1: The Body of Information (BOI) to which a person is exposed represents a *version* of reality. Instituting a BOI is a selective process; much depends upon which pieces of information have been assembled into a coherent narrative.

Principle #2: The choice of audience affects the *strategy* and *content* of the information. Consequently, assessing the BOI - the composite of Information that has been collected by (or for) an individual—can provide insight into the intended audience.

Principle #3: Data is, in itself, neutral. What determines whether it is instructive or deceptive depends largely on *who* is selecting and assembling the information, *why* it is being presented, and *who* is the intended *audience*.

Keywords: information literacy, media literacy, research, ability, access, audience, content, analysis.

1. Introduction

Over the last two hundred years, we have moved from an Agrarian Society, through the Industrial Age, into a Service Economy, and finally to an Information Culture. To be sure, we continue to grow food and manufacture products. But in contemporary society, information has emerged as our principal resource. As reporter Natasha Singer observes, “Data is the new oil.” (Singer, 2013).

This cultural transformation has been accompanied by the emergence of a new discipline: Information Literacy. Information Literacy can be defined as *the ability to access and assess information*. Information literacy operates according to a set of principles and strategies that enable individuals to make sense of the information we are exposed to on an ongoing basis. These strategies also provide a framework that facilitates the discussion of Information with others—including children, peers, and the people responsible for the presentation of information.

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2. Materials and methods

• **Principle #1** The Body of Information (BOI) to which a person is exposed represents a *version* of reality. Instituting a BOI is a selective process; much depends upon which pieces of information have been assembled into a coherent narrative.

• **Principle #2** The choice of audience affects the *strategy* and *content* of the information. Consequently, assessing the BOI - the composite of Information that has been collected by (or for) an individual—can provide insight into the intended audience.

• **Principle #3** Data is, in itself, neutral. What determines whether it is instructive or deceptive depends largely on *who* is selecting and assembling the information, *why* it is being presented, and who is the intended *audience*. Alex Pentland, Toshiba Professor at MIT's Media Lab, regards Big Data as “a classic example of “Promethean fire: It can be used for good or ill.”

UNESCO, the education wing of the United Nations, has advocated combining Information Literacy with another discipline: Media Literacy. The most obvious point of convergence between these two disciplines is the application of *critical thinking skills* to their particular areas of focus. But although these disciplines are clearly related and, in some instances, overlap, they remain distinct areas of study:

- Information Literacy applies critical thinking skills to the assessment of Information.
- Media Literacy is a critical thinking skill that is applied to the *source* of most of our information—the channels of mass communication.

3. Discussion and Results

Information Literacy—again, the ability to *access* and *assess* information-- focuses on the following Lines of Inquiry:

1. *Identifying patterns of data in ways that previously have been impossible to detect.*

The discipline of Information Literacy is rooted in *Epistemology* – the branch of philosophy that focuses on the nature and origin of Knowledge. The primary unit of Information Society is *data*—that is, factual information that is expressed through quantifiable measurements. When linked together, data forms complex units of information. The formation of these “links” is the dynamic behind the conversion of data into *Knowledge*. Knowledge requires a familiarity with factual information, an understanding of derivations, contexts, and processes. Moreover, knowledge is cumulative, building on existing information to extend an idea or create a new concept.

The final Epistemological stage is the conversion of Knowledge into *Wisdom* – a personal process, in which an individual considers the context, implications, nuances, connections, and consequences of the human experience.

However, the avalanche of information available in the digital media age represents the first major obstacle to the analysis of information:

- Between the birth of the world and 2003, five exabytes of content were created. In 2013, 5 exabytes of content were created *each day* (Gunelius, 2014).
- An individual's daily consumption of information through the channels of mass media now exceeds 6.9 zillion (i.e. million million) gigabytes of information per day (Zverina, 2015).
- Fortune 500-size companies have accumulated over an exabyte (a billion gigabytes) of data scattered across thousands of servers and hundreds of thousands of software applications (White, 2014).

This influx of information raises serious concerns about our ability to circumnavigate through this vast ocean of material. In his short story, “Reification”, R. Joseph Heagany alludes to this conundrum:

Even now, dear reader, you underestimate the impact of what you know. Why? Because the amount of knowledge now in your world exceeds your ability to understand it, let alone even observe it. Hence, you are compelled to underestimate its impact in proportion to your inability to understand it. Still, we do increase in understanding, albeit at a pace far behind that of unfolding knowledge. It is this permanent laggard position between our brains and ‘what is’ that is distressful to me, and why, perhaps, I reply to the universal question of ‘What if?’ with a yawning, ‘Whatever.’ (Heagany, Unpublished).

As Heagany suggests, we don't need to be able to discover *more* data so much as we need to figure out ways to make sense of the information that we *do* possess. It is within this context that Information Literacy has emerged as an essential area of study, providing us with the tools to make sense of the information that we receive on an ongoing basis.

One of the foremost characteristics of digital technology is its ability to extend human beings' *gestalt*: that is, our innate *predisposition to order*. Unlike other members of the animal kingdom, human beings can detect patterns within larger, complex bodies of information. For instance, a photograph of a sailboat that appears in the newspaper is actually a composite of dots, in different shades and/or colors. However, because human beings are gifted with the ability to detect patterns, they can identify the sailboat within this amalgam of dots.

But now, due to the overwhelming amount of information in the virtual universe, it has become nearly impossible to detect patterns within accumulated information. Moreover, a number of the factors further complicate this process:

- The analysis of data often works within a strict time imperative, pressuring individuals to make immediate sense of reams of data.

- Knowledge is often sequential in nature, building on existing information. As a result, assimilating a body of information may require prerequisite understandings within this mass of information before moving to the next level of knowledge.

- The acquisition of information may have complex implications, which can be easily overlooked and undetected.

Initially, computers were developed for the instantaneous gathering of data but did not have the capacity to discover patterns within the mass of information. Some scholars' predictions about the computer's ability to recognize patterns was predicated on head-to-head competition with human beings in the ancient game of *Go*, which requires the instantaneous recognition of complex patterns in a mass of information. Computer scholar George Johnson explains,

Capturing in a computer something closer to human intuition — the ability to seek and respond to meaningful patterns — seemed crucial and very far away. Back in 1997, I wrote, 'To play a decent game of *Go*, a computer must be endowed with the ability to recognize subtle, complex patterns and to draw on the kind of intuitive knowledge that is the hallmark of human intelligence.' Defeating a human *Go* champion... will be a sign that artificial intelligence is truly beginning to become as good as the real thing." (Johnson, 2016).

As a result, Johnson predicted, "It may be a hundred years before a computer beats humans at *Go* — maybe even longer." (Johnson, 2016). Dr. Piet Hut, an astrophysicist and *Go* enthusiast at the Institute for Advanced Study in Princeton, N.J., agreed. In 1997, he declared, "If a reasonably intelligent person learned to play *Go*, in a few months he could beat all existing computer programs. You don't have to be a (chess champion Gary) Kasparov... That was the prevailing wisdom." (Cit: Johnson, 2016).

However, in March 2016, after a Google computer program called AlphaGo defeated the *Go* master Lee Se-dol, Hut admitted, "I was way off, clearly, with my prediction... It's really stunning."

But now, computers have the capacity to find patterns within the mass of information, so that, according to reporter Benedict Carey, "analysts (can) build a reliable catalog of digital patterns that provide meaningful 'clues' to the underlying reality, whether it's the effect of a genetic glitch, a low-pressure zone or a drop in the yen." (Carey, 2015).

However, the process of identifying patterns still must begin with the application of human *gestalt*. Significantly, in 2014, the Albert Einstein College of Medicine of New York hired conceptual artist Daniel Kohn, who was charged with the task of helping students develop their perceptual skills. "One thing I try to argue is that it's not just about bigger machines to crunch more data, and it's not even about pattern recognition. It's about frameworks of recognition; how you choose to look, rather than what you're trying to see." (Kohn, 2015). In order not to drown in numbers, one must know what to look *for*. In this sense, this process is rather like proofreading. If you are looking for all grammatical errors at the same, you will surely miss some. But if you proofread looking for *one* type of grammatical error, you are more certain to find it. Of course, this means that a copyeditor must proofread multiple times — looking for each category of error.

Visual analytics is a digital technique that mirrors humans' innate *gestalt*. According to Singer, Visual Analytics "offers animated interactive statistics online that help visitors spot trends on their own":

In an uncharted world of boundless data, information designers are our new navigators. They are computer scientists, statisticians, graphic designers, producers and cartographers who map entire oceans of data and turn them into innovative visual displays, like rich graphs and charts, that help both companies and consumers cut through the clutter. These gurus of visual analytics are making interactive data synonymous with attractive data (Singer, 2011).

Analysis of Big Data refers to an approach designed to locate specific categories of information in a short amount of time. *Big Data* is a term that refers to a Body of Information (BOI) that that can be selectively accessed and analyzed through digital technology. Big Data is divided into the following categories:

- Content
 - Social
 - Business
 - Entertainment
 - News
 - Educational
 - Economic
- Channels of Communication (e.g. Text, Data, Video, Graphics)
- Designated Information: Information that is transmitted through specific media (e.g. phone calls or fax transmissions) or to specific audiences
 - Undesignated Information:
 - Information directed to a broad audience
 - Personal Information
 - Information that does not stand for itself but is woven into an economic context (e.g. information about/from businesses or industries)

In addition, digital technology enables researchers to conduct *cross-analysis* with other data sets. To cite an example, economist Seth Stephens-Davidowitz examined *Fame* as a social phenomenon, focusing on the variable of "geographical origins" of celebrities. The data revealed that there was, indeed, a correlation between location and fame. One in 1,209 baby boomers born in California achieved celebrity status (as defined by an appearance in *Wikipedia*); in contrast, only one in 4,496 baby boomers born in West Virginia appeared in the publication (Stephens-Davidowitz, 2014).

Stephens-Davidowitz also factored in the variable of *vocation* and found that approximately 30 percent achieved fame through art or entertainment, 29 percent through sports, 9 percent through politics, and 3 percent through academia or science (Stephens-Davidowitz, 2014).

Cross-referencing also enables companies to customize their marketing appeals. Eric Bieschke, Pandora's chief scientist, explains,

Because Pandora users provide their ZIP codes when they register, we can play ads only for the specific districts political campaigns want to target, and we can use their music to predict users' political affiliations (Cit: Singer, 2014).

In addition, using various databases, scholars can now trace the appearance and frequency of *Keywords* throughout published works to furnish perspective into social movements, developments, and influences. Areas of study include:

- Etymology (Derivation of Language)
- Values Identification/Analysis
- Predictive Search
- Audience Identification Research
- Shifts in Culture

Jean M. Twenge, W. Keith Campbell, and Brittany Gentile have pointed out three ways that studying the uses of language in literature can provide insight into cultural change:

- Individual (author's) level - Language use reflects the viewpoints of book authors, showing change in the values and attitudes of influential portions of the population.
- Segments of the Population - Books may mirror a market-driven assessment of what people want to read, capturing changes in the preferences of the population of Americans who read books.
- General Population - Language use in books may be a microcosm of the language use of people living in that time. For example, a fiction writer may aim to capture realistic modern dialogue (Twenge, Campbell, Gentile, 2012).

To illustrate, Fred Shapiro, Associate Director at the Yale Law School Library, discovered a printed reference to the term "African American" in a 1782 sermon, pushing the origins of the term back to the time of the American Revolution.

Shapiro's discovery is a direct result of the existence of extensive databases that facilitate research "by gathering vast swaths of historical texts — once scattered across the collections of far-flung libraries and historical societies — in one easily searchable place." (Cit: Schuessler, 2015).

The cultural significance of the term "African-American" lies in the categorization of this subculture within the tradition of *other* immigrant groups. Shapiro explains, "We think of it as a neutral alternative to older terms, one that resembles 'Italian-American' or 'Irish-American'. It's a very striking usage to see back in 1782." (Schuessler, 2015). Moreover, Schuessler points out that the term "emphasiz(es) their claim to being 'American' — a label which was applied to people of European descent living in the colonies by the end of the 17th century." (Schuessler, 2015).

II. Information Literacy examines the Association Between a Body of Information and Its Intended Audience(s)

Understanding the many and complex connections between a Body of Information (BOI) and its audience is an essential aspect of the discipline of Information Literacy. Digital technology enables information to be customized to the interests of each member of the audience. For example, digitized window displays in malls are programmed to identify the pedestrians passing their store and promote items that may be of particular interest to that customer.

The following questions can provide insight into the association of a BOI and its intended Audience:

- For whom is the Body of Information (BOI) produced?
- How do the experiences and perspectives of an individual audience member affect his/her interpretation of the Information?
- How does the choice of audience influence the strategy, style, and content of the body of Information?
 - a. What Information has been included and omitted in the Body of Information?
 - b. How have these choices affected the point of view of the BOI?
- Conversely - do the strategy, style, and content of the BOI provide insight into the intended audience(s)?

Audience Identification. The discipline of Information Literacy can provide insight into the attitudes and values of the intended audience.

As Singer observes, this personal information addresses fundamental questions that answer basic business questions about their potential audience: "Are they legitimate? Are they worth pursuing? Are they worth spending money on?" (Singer, 2012).

Audience Network Information literacy also examines the formation of subcultures; that is, the connections between members of the audience. As Mark Wilson points out, "With more than two billion Internet users and more than six billion mobile phones in use, many in the world are extensively connected to each other and to information." (Wilson, Kellerman, Corey, 2013). Marketers may even gauge the influence of an individual with *others* by ascertaining the number of "friends" the person has accumulated.

For whom is the Body of Information (BOI) produced?

- *Is there more than one intended audience?*
- *Who is connected to each other?*
- *Why are these Contacts connected to one another?*
- *What are the points of commonality between the individuals who have been targeted to receive particular Information?*
- *What shared values, experiences, and perspectives influence the audience(s)' understanding or interpretation of the BOI?*

Impact of BOI on Attitudes and Behaviors In the Information Age, personal information is considered a *product*, to be sold to those who use data to serve their own personal or professional objectives — often without the knowledge of the individual who is the focus of attention. Singer provides the following examples:

A bank that wants to sell its best customers additional services, for example, might buy details about those customers' social media, Web and mobile habits to identify more efficient ways to market to them. Or...a sporting goods chain whose best customers are 25- to 34-year-old men living near mountains or beaches could buy a list of a million other people with the same characteristics. The retailer could...(then) manage a campaign aimed at that new group, testing how factors like consumers' locations or sports preferences affect responses (Singer, 2012).

An online ad customization technique, known as *behavioral targeting*, enables businesses to *influence* consumer behaviors and attitudes by crafting personalized messages, based on an individual's social media activity, credit card histories and Web habits. Reporter Tanzina Vega offers the following illustration:

'If I have three different cars, how do I launch them to the right audience?' In milliseconds, fast technologies can determine whether a person is in the market for a new car or has bought a car recently, yielding different types of ads. One ad could focus on a new vehicle that a company is trying to promote to energy-conscious drivers, while another might focus on accessories for the car (Vega, 2013).

Behavioral targeting enables communicators to use information in the following ways:

- *Anticipating audience behaviors*
- *Selecting information that appeals to the preferences and expectations of the intended audience.*
- *Devising strategies that generates an anticipated response from the audience.*
- *Disclosing how individuals feel about a subject.*
- *Eliciting immediate feedback from the audience.*
- *Building relationships with clients*

Ethical Concerns Thanks to digital technology, the traditional boundaries of privacy have been obliterated. The analysis of social media, credit card histories and Web habits provide insight into an individual's political beliefs, religious faith, sexual orientation and other personal issues.

This ability to identify and access an individual's private information has raised enormous legal and ethical questions. While Fordham Law School professor Joel R. Reidenberg acknowledges that there can be legitimate commercial needs for some businesses like ethnic restaurants, to know the race or ethnicity of consumers, "at the same time, this is ethnic profiling. The people... are being sold based on their ethnic stereotypes. There is a very strong citizen's right to have a veto over the commodification of their profile." (Cit: Singer, 2012).

In March, 2016, the U.S. government proposed a series of privacy rules that would, in some instances, make Internet providers like cable and phone companies ask individuals for their permission before using or sharing their Data. The Federal Communication Commission (FCC) also wants to institute rules that define the ways in which ISPs protect their Wire Service Data from breaches and how quickly they inform the public if the content is disrupted by a hacker (FCC, 2016).

III. Information Literacy can furnish insight into the Function of Information.

In addition to the network of contacts within this Information Society - *Who* is connected to each other — investigation of Network Societies can extend to *why* information is connected in this

complex world. Identifying the function (or purpose) of Information can provide insight into its uses: is it instruction, entertainment, historical content, or an artistic work?

Manifest Function refers to the primary reason(s) behind a communication activity. However, information may also contain a *Latent Function* (or functions) - instances in which the digital media communicator's intention may not be immediately obvious to the audience.

At times, the Manifest Function may be subordinate to its Latent purposes. As an example, the 1955 animated version of George Orwell's *Animal Farm* was markedly different from the original novel. Journalist Laurence Zuckerman explains,

Many people remember reading George Orwell's *Animal Farm* in high school or college, with its chilling finale in which the farm animals looked back and forth at the tyrannical pigs and the exploitative human farmers but found it impossible to say which was which.

That ending was altered in the 1955 animated version, which removed the humans, leaving only the nasty pigs.

Another example of Hollywood butchering great literature? Yes, but in this case the film's secret producer was the Central Intelligence Agency.

The CIA, it seems, was worried that the public might be too influenced by Orwell's pox-on-both-their-house critique of the capitalist humans and Communist pigs. So after his death in 1950, agents were dispatched (by none other than E. Howard Hunt, later of Watergate fame) to buy the film rights to *Animal Farm* from his widow to make its message more overtly anti-Communist (Zuckerman, 2000).

Thus, while the manifest function of the film was *entertainment*, the latent function was *political persuasion*, or *propaganda*.

Some common Information Functions include the following:

Expression Occasionally, speakers inform the listener of their frame of mind-what they are thinking at that moment, how they are feeling, or their attitudes toward people and issues.

Description can involve elaboration on general statements, providing concrete examples and details.

Instruction refers to occasions in which the audience benefits by exposure to Information that they find to be of personal benefit. Thus, the purpose is either 1) to inform others about a subject with which they are unfamiliar or 2) to furnish *additional* information about a subject with which the audience is already acquainted. This Function occurs in educational situations, in intra-generational conversations, and in journalistic settings. Innovations in media technology have created a range of channels through which the news is delivered, including print newspapers, radio, television, the Internet, and mobile devices.

Persuasion is a function in which the communicator's objective is to promote a particular idea or motivate the audience to change specific behaviors or attitudes. In this case, information has a political function, emerging as a means of attaining and preserving power. Advertising also attempts to persuade the intended audience to think positively about their product and, ultimately, to purchase their brand.

In addition, persuasion is also the primary goal of *propaganda*. In addition to formal instances of propaganda, many media presentations (e.g. films or television programs) can have an *indirect* propagandistic function, conveying exciting and/or flattering messages about America.

Creative expression. Novelists, painters, and experimental videographers express themselves through their art and share their artistic vision with the audience. Thanks to digital technology, independent artists and non-professionals have the means to produce, edit, and distribute their works of art.

Profit Unbeknown to the individuals engaged in conversations on Social Media sites such as Facebook, Twitter and Foursquare, interested parties are eavesdropping on these chats and selling personal information to companies interested in doing business with these individuals. As Mark LaRow, senior vice president for products at the software company MicroStrategy, asserts, "This is like the biggest focus group someone could ever imagine." (Cit: Clifford, 2012). For example, Facebook's App makes it convenient for the legion of Facebook participants to post information about themselves. But at the same time, companies are able to gather information about what current or potential customers do and like, or what rich customers prefer versus poorer ones. Reporter Stephanie Clifford provides the following examples of market research applications of social media:

When Wal-Mart wanted to know whether to stock lollipop-shaped cake makers in its stores, it studied Twitter chatter. Estée Lauder's MAC Cosmetics brand asked social media users to vote on which discontinued shades to bring back. The stuffed-animal brand Squishable solicited Facebook feedback before settling on the final version of a new toy. And Samuel Adams asked users to vote on yeast, hops, color and other qualities to create a crowdsourced beer, an American red ale called B'Austin Ale that got rave reviews (Clifford, 2012).

Moreover, social media sites can gauge consumers' *levels of interest* in a company's goods or services. As Stephanie Clifford observes, "(A social media site) sets baselines for what a normal level of buzz around, say, electronics or toys is, so it can measure when interest is getting high." (Clifford, 2012).

Over time, market research tools have become increasingly specialized. For instance, Wal-mart has opened a unit, called @WalmartLabs, that is dedicated exclusively to the analysis of digital clues such as Twitter posts, public Facebook posts and search terms on Walmart.com, that helps Wal-Mart decide what merchandise to carry and the best locations for particular goods and services.

In addition, a number of companies rely upon *E-scores*, an online calculation that measures the potential value of customers by accurately predicting spending. Singer explains,

(E-scores) can take into account facts like occupation, salary and home value to spending on luxury goods or pet food too predict "which customers will visit again, what products will interest them and which special offers will appeal to them. These scores can determine whether someone is pitched a platinum credit card or a plain one, a full-service cable plan or none at all. They can determine whether a customer is routed promptly to an attentive service agent or relegated to an overflow call center (Singer, 2012).

This software employs a formula that factors in occupation, salary and home value to project personal spending on a range of items. Elizabeth Francis, chief marketing officer of the Gilt Groupe, observes, "It tells us exactly what customers are interested in. It's amazing that we can get that kind of real feedback, as opposed to speculating."

Control Digital technology has emerged as a way to assert and/or maintain political power. In 2015, the following developments came to light:

- The United States has been actively spying on Germany and other allies. Wikileaks disclosed that National Security Agency had been intercepting German Chancellor Angela Merkel's cell phone communications (Gardian, 2015).
- More than a dozen governments, including Turkmenistan, Brunei and Bahrain have been targeting its political dissidents. The reports disclosed that by 2015, the market for "off the shelf" spy software has grown to \$5 billion a year (Perlroth, 2012).
- An obscure 1986 communications law entitles the U.S. federal government to read any of its citizens' emails that are over six months old without a warrant. The '180-day rule extends Fourth Amendment protections against unreasonable search and seizure only to electronic communications sent or received fewer than 180 days ago. Consequently, the government can treat any emails, text messages or documents stored on remote servers - popularly known as the cloud - as 'abandoned' and therefore accessible using administrative subpoena power (Weber, 2015).

IV. Historical Context

Because many popular media presentations derive their meaning from the historical events of the day, the sudden appearance (or disappearance) of information can furnish perspective into the historical period in which it was produced.

Examining a BOI from a different era can furnish perspective into the period in which it was produced. Jean-Baptiste Michel, co-founder of Google Books Ngram Viewer, discusses his project in these terms:

We wanted to create a scientific measuring instrument, something like a telescope, but instead of pointing it at a star, you point it at human culture...Digitized data is really powerful when it becomes long enough over time so you can see trends in society and culture that you could not see before. You are getting a whole new vantage point on something (Cit: Singer, 2013).

As an example, in 2011, J.-B. Michel and his research team studied the impact of the past on

contemporary society by tracing references in books to specific time periods. References to “1880,” which peaked in that year, fell by half by 1912, a span of 32 years. In contrast, references to “1973” declined to half its peak by 1983—only 10 years later. “We are forgetting our past faster with each passing year,” the authors concluded (Michel, 2011).

Moreover, studies focusing on the *absence* of words and phrases can also provide insight into historical eras. Singer provides an example about notable absences of words in Nazi Germany as an indication of political repression under that regime:

To detect censorship in Germany under the Nazis, for instance, they tracked the mentions and omissions of well-known artists — reporting that Marc Chagall’s full name surfaced only once from 1936 to 1943 in the German book records, even as this Jewish painter’s name appeared with increasing frequency in English texts (Michel, 2011).

Analyzing patterns of information over a long period of time can also furnish perspective into culture. To illustrate, studies designed to gauge the effectiveness of a 1990s Anti-poverty program, “Consider Moving to Opportunity,” that provided housing assistance for low income families, initially found that the effectiveness of the program was “disappointing,” finding little or no improvements in test scores for children or earnings for adults.

However, the researchers, Harvard economists Raj Chetty, Nathaniel Hendren and Lawrence F. Katz continued to monitor the test scores of the children involved in the program for another decade. This study revealed that their earnings as adults actually *exceeded* others in their original demographic categories (Chetty, Hendren & Katz, 2015).

In addition, Information Literacy can identify attitudes *toward* historical events. To illustrate, in 2015, a Stanford University research team successfully conducted a data mining project, “Mapping Emotions in Victorian London,” which mapped the British capital’s “emotional geography” by categorizing what feelings or sensations common settings conveyed in the novels of Dickens, Thackeray, Austen and other 19th-century authors (Blumenthal, 2015).

In addition, because the American media industry relies so heavily on cultural trends as the raw material for programming, entertainment programs frequently *anticipate* historical events. To illustrate, a 1990 study found that pessimistic lyrics in Top 40 songs predicted an economic decline about two years later (Belluckjan, 2014). To cite another example, a 1999 study found that when social and economic conditions were bad, movie actresses with “mature facial features” — small eyes, thin cheeks, large chins — were popular, but when conditions were good, the public liked actresses with childlike features (Belluckjan, 2014).

Conversely, an understanding of historical events can furnish perspective into a Body of Information. The more that individuals know about an event, the better equipped they are to assess the BOI. As an example, the lineup of sponsors of the broadcast of the 2009 Superbowl may well be puzzling to someone unacquainted with events surrounding the broadcast. Instead of the usual ads for “big ticket” items such as cars, the 2009 sponsors consisted largely of online employment companies such as Cash for Gold.com, Careerbuilder, and Monster.com. However, this mystery may be explained by recalling that the event took place in the midst of the “Great Recession,” when Superbowl viewers might not have the disposable income for expensive items and instead, might be more responsive to ads for services offering financial relief.

Applying the following questions related to *Historical Context* can provide insight into Bodies of Information (BOI):

- What does the Information tell us about the period in which it was produced?
 - a. When was this Information first presented?
 - b. How has Information been influenced by the events of the day?
 - c. Does the Information comment on the events of the day?
- Does an understanding of historical events provide insight into Content? (i.e., Information originating during a particular historical period)
 - a. What events were occurring when the presentation was produced?
 - b. How does an understanding of these events furnish perspective into the Content?
- Historical References
 - a. Are there historical references in the Information?

b. How does an understanding of these historical references affect your understanding of the Information?

- Did the appearance of this Information anticipate or foreshadow any political or historical events? Explain.
- Did the presentation play any role in shaping the events of the day? Explain.
- In the case of entertainment programming, how accurately does it present historical events?
 - a. Is the account an accurate portrait of events? Compare the account with historically accurate accounts of the event or period.
 - b. Are the causes leading to the events in the presentation clear?
 - c. What were the consequences of the dramatized events?
- In the case of a news story, how much historical context has been provided?
- Where would you find the answers to these unanswered questions? (Silverblatt, 2014).

V. Cultural Context

Information Literacy can serve as a text that *reflects, reinforces, and shapes* cultural attitudes, values, behaviors, preoccupations, and myths. As an example, Taykey, an Israeli startup, is designed to connect clients' products to cultural trends, by conducting "semantic analysis across the web in real time to find out what's trending for your (sic) demographics at any given moment, and automatically deliver your ad there." (Taykey).

Worldview What kind of world is being depicted in a particular Body of Information? Narratives such as novels, advertisements, and political communications present complete worlds, populated by certain types of people and operating according to a clear set of values and procedures. Consequently, applying the following questions related to *Worldview* can be a valuable key to discovering manifest and latent messages contained in a BOI.

Worldview: What kind of world is depicted in the BOI?

- What culture or cultures populate this world?
 - a. What kinds of people populate this world?
 - b. What is the ideology of this culture?
- What do we know about the people who populate this world?
 - a. Are characters presented in a stereotypical manner?
 - b. What does this tell us about the cultural stereotype of this group?
- Does this world present an optimistic or pessimistic view of life?
 - a. Are the characters in the presentation happy?
 - b. Do the characters have a *chance* to be happy?
- Are people in control of their own destinies?
 - a. Is there a supernatural presence in this world?
 - b. Are the characters under the influence of other people?
- What hierarchy of values can be found in this worldview?
 - a. What embedded values can be found in the people who appear in the BOI??
 - b. What does it mean to be a success in this world?
 - 1) How does a person succeed in this world?
 - 2) What kinds of behavior are rewarded in this world?

Obviously, most non-narrative BOIs (e.g. a telephone directory) provide an incomplete Worldview. But some of these questions may, indeed, apply.

Culturomics refers to the quantitative analysis of social sciences and humanities that provide a fresh perspective into culture. Reporter Steve Lohr explains,

It is this ability to collect, measure and analyze data for meaningful insights that is the promise of Big Data technology. In the humanities and social sciences, the flood of new data comes from many sources including books scanned into digital form, Web sites, blog posts and social network communications (Lohr, 2013).

Thus, the field of Culturomics can be broken into the following fields: Political Methodology (Political Science) Cliometrics (History), and Literary Studies (Stylometry).

To illustrate, a study by Twenge, et. al, examined the rise of Individualism in American culture by charting the appearance of "individualistic" and "communal" words in literary works. First, they tallied the appearance of the following *individualistic* words: *independent, individual, individually, unique, uniqueness, self, independence, oneself, soloist, identity, personalized, solo, solitary,*

personalize, loner, standout, single, personal, sole, and singularity. They then recorded the frequency of the following communal words: *communal, community, commune, unity, communitarian, united, teamwork, team, collective, village, tribe, collectivization, group, collectivism, everyone, family, share, socialism, tribal, and union.*

Between 1960-2008, the appearance of individualistic words did, indeed, increase in American books, while the rate of appearance of communal words remained constant over the same period. The researchers concluded,

We believe these data provide further evidence that American culture has become increasingly focused on individualistic concerns since 1960... Thus, America today is culturally distinct from America in 1960-at least in the realm of individualism (Twenge, Campbell & Gentile, 2012).

Social Media as Cultural Text Social media conversations currently are being “mined” to disclose cultural trends and information about individuals and events. To illustrate, in the aftermath of the bomb massacre that took place during the 2013 Boston Marathon, a popular narrative emerged about the perpetrators, Tamerlan Tsarnaev and his younger brother, Dzhokhar. The *Boston Globe* reported,

A picture has begun to emerge of 26-year-old Tamerlan Tsarnaev as an aggressive, possibly radicalized immigrant who may have ensnared his younger brother Dzhokhar — described almost universally as a smart and sweet kid — into an act of terror... But what about that image of Dzhokhar as sweet? (Blow, 2013).

Within days, digital news outlets BuzzFeed and CNN claimed to verify Dzhokhar’s Twitter account. *New York Times* columnist Charles M. Blow examined Dzhokhar’s tweets and discovered attitudes that contradicted this image:

- *Dzhokhar tweeted quite a bit about women, dating and relationships; many of his musings were misogynistic and profane.*
- *(Dzhokhar) was a proud Muslim who tweeted about going to mosque and enjoying talking — and even arguing — about religion with others. But he seemed to believe that different faiths were in competition with one another. On Nov. 29, he tweeted: ‘I kind of like religious debates, just hearing what other people believe is interesting and then crushing their beliefs with facts is fun.’*
- *(Dzhokhar) was apparently a 9/11 Truther, posting a tweet on Sept. 1 that read in part, ‘...It’s hard for many of you to accept that 9/11 was an inside job. (Blow, 2013).*

Online posts can also reveal *shifts* in outlook and attitudes. As Blow points out, “Toward the end of last year, the presence of dark tweets seemed to grow — tweets that in retrospect might have raised some concerns.

- *Oct. 22: I won’t run. I’ll just gun you all out #thugliving.*
- *Jan. 5: I don’t like when people ask unnecessary questions like how are you? Why so sad? Why do you need cyanide pills?*
- *Jan. 16: ‘Breaking Bad’ taught me how to dispose of a corpse.*
- *Feb. 2: Do I look like that much of a softy?... Little do these dogs know they’re barking at a lion.*
- *Feb. 13: I killed Abe Lincoln during my two hour nap #intensdream (Blow, 2013).*

Digital analysis can also focus on *Sentiment Analysis*: that is, how individuals *feel* about a particular topic. As Stephanie Clifford explains, “... If people overwhelmingly dislike a new video game, ordering pallets of the game is not a great bet.” (Clifford, 2012) By identifying keywords, services like *Sentiment Metrics* or *Radian 6* can help a company track how it is being discussed online.

VI. *Information Literacy provides ways to ascertain the legitimacy of information.*

How do you assess the veracity of information in our digital environment?

Because of the open nature of the digital domain, the information available is, to be kind, uneven. In traditional print venues, much of the content has been subjected to a stringent review

process to verify the validity of the content. Newspaper reporters and book authors routinely work in tandem with editors to insure accuracy. In like fashion, scholarly articles generally go through a rigorous peer review process. However, no such process exists with respect to the content that appears on the Internet.

As a result, it can be instructive to apply the following questions to the materials that comprise a BOI:

- *Is the information verifiable?*
- *Is the content supported by evidence?*
- *Is the information current?*

When was the information first published? When was the site updated?

The date of the last revision usually appears at the bottom of the home page. But if the publication date remains unclear, the material could be outdated and therefore should be discarded.

- *Is the information accurate?*
 - a. Does the BOI contain any errors or misrepresentation of facts?
 - b. Is the narrative based on any false assumptions?

- *Is the information complete?*

Understanding what information has been included and/or omitted can furnish perspective into the point of view of the person or organization selecting the information.

- *What are the sources of information?*

If a communicator relies on sources, the audience should be alert with regard to the following:

- a. *Expertise*: Is the source an authority on the subject at hand?
- b. *Motive*: Why is a source willing to contribute to the BOI?
- c. *Point of View*: What perspective does the source (or sources) represent?
- *Is the content consistent?*

J. Ormondroyd declares, "The consistency test simply requires that the argument or information does not contradict itself. Sometimes when people spin falsehoods or distort the truth, inconsistencies or even contradictions show up. These are evidence of unreasonableness (Ormondroyd, Engle, & Cosgrave, 1996).

- *Is the information corroborated?*

Ormondroyd poses the following questions: "Does the work update other sources, substantiate other materials you have read, or add new information? Does it extensively or marginally cover your topic?

You should explore enough sources to obtain a variety of viewpoints (Ormondroyd, Engle, & Cosgrave, 1996).

Finally, assessing the legitimacy of Information can also be complicated by adherence to the principle of *Objectivity*. The American Society of Professional Journalists' Code of Ethics declares,

Good faith with the public is the foundation of all worthy journalism.

1. *Truth is our ultimate goal.*
2. *Objectivity in reporting the news is another goal which serves as the mark of an experienced professional. It is a standard of performance toward which we strive. We honor those who achieve it (Society...).*

However, this code assumes that: 1) an Absolute Truth exists; and that 2) journalists are in a position to present this ideal Truth without personal bias or distortion.

But although a fact may be *accurate*, it may not be *true*. As legendary newspaper commentator Walter Lippmann has observed, news only approaches Truth in cases of quantifiable

information, such as the temperature, sports scores, and election results. But even in these cases, information can be far from absolute. For instance, a weather report can only accurately measure the specific place where the temperature is being calibrated. Variables such as the amount of green space in the region versus densely constructed areas that retain heat can cause a fluctuation of several degrees in temperature within a thirty-mile radius.

However, audience members often confuse fact with Truth. As an example, in July 2012, the following headline appeared in the *New York Times*: “Syria Moves Some Chemical Weapons, U.S. Says” ([Schmitt, 2012](#)). But although it is a *fact* that American officials made this comment, the statement is not necessarily *true*.

Context can also determine whether a statement of fact represents either a partial or whole truth. Author Cynthia Crossen has cited several instances in which advertisers have manipulated numerical data to promote the merits of their products:

- A Levi’s ad cites a survey, in which ninety percent of college students say Levi’s 501 jeans are ‘in’ on campus. However, close examination reveals that the students chose from this list:
 - Levi’s 501 jeans;
 - T-shirts with graphics;
 - 1960s-inspired clothing;
 - Lycra/spandex clothing;
 - Overalls;
 - Patriotic-themed clothing;
 - Decorated Denim;
 - Printed pull-open beach pants;
 - Long-sleeved hooded T-shirts; and
 - Neon-colored clothing.

In other words, there was no way to vote for blue jeans except Levi’s 501’s. ([Crossen, 1994](#)).

- A commercial for USAir points out that their airline had the best on-time record of ‘any of the seven largest airlines’. However, a careful examination finds that USAir had arbitrarily stopped counting at seven; the eighth-largest airline, Pan Am, actually had the best on-time record of all of the airlines ([Crossen, 1994: 75](#))

- A survey conducted by New York City area Dodge dealers found that most owners of Toyotas, Hondas, Fords and Chevrolets actually preferred the Dodge *Shadow*...100 people were surveyed, all owners of older models of one of the other cars...The only new vehicle they were allowed to drive was the Dodge *Shadow*. Not surprisingly, more than 70 percent preferred the Dodge. Crossen declares, “(These) surveys contradict the actual proof of what people prefer: their purchases.” ([Crossen, 1994: 76-77](#)).

Thus, although the meaning of a number is objective, the *use* of numbers in research can be subjective.

Of course, facts are manipulated in the political arena as well. To illustrate, in December 2015, Republican presidential hopeful Ted Cruz declared that Democrats are soft on crime because “an overwhelming majority of violent criminals are Democrats”:

Now listen, here’s the simple and undeniable fact. The overwhelming majority of violent criminals are Democrats...The Democrats for years have been viewed as soft on crime, because they go in and they appoint to the bench judges who release violent criminals. They go in and fight to give the right to vote to convicted felons. Why? Because the Democrats know convicted felons tend to vote Democrat (Cit: [Hopper, 2015](#)).

A spokesperson for the Cruz campaign explained that the Senator was referencing a study that had examined ex-felons’ voter registration records and turnout in three states-North Carolina, New York and New Mexico.

When ABC News asked Cruz about these remarks, he said he was “engaging in a process called *Reasonable Inference*.”

An inference is actually rational reasoning, which people do all the time. When elected Democrats push to give felons the right to vote, *it is a perfectly rational and reasonable inference to say those Democrats understand that the overwhelming majority of violent criminals vote Democratic* (Cit: [Hopper, 2015](#)).

This study, indeed, confirmed that most ex-felons who registered to vote had identified their party affiliation as “Democratic.” However, as a practiced debater, Cruz knows that the *reasonable* part of this definition requires that the inference is, in fact, a “logical” explanation of the facts. Instead, Cruz’ statement is an example of “*Unreasonable Inference*,” in which the facts are manipulated to support his political agenda. Cruz draws the following conclusions from the study:

- Membership in the Democratic Party plays a central role in the violent crimes committed by these individuals.
- Elected officials appoint “senior Justice Department officials” and lawyers who “lionize” and “glorify” cop killers.
- Democrats are soft on crime because “an overwhelming majority of violent criminals are Democrats.”

However, other possible inferences (which could be *reasonable* or *unreasonable*) include the following:

- The majority of imprisoned Americans are members of minority groups who regard the Democrats as the more likely political party to provide support, direction, and assistance for themselves and others in similar circumstances.
- Traditionally, the families of these prisoners tended to vote for Democratic candidates.
- These prisoners supported individual Democratic candidates, based on their positions on issues unconnected to crime, such as same sex marriage or climate change legislation.

Significantly, the political leaders, marketing specialists, and advertisers who deliberately manipulate facts are not only instructing the public *what* to think but also *how* to think. Consequently, citizens must carefully scrutinize statements by politicians and others in the public arena to see for themselves how communicators have chosen to *use* facts.

Rather than Objectivity, a more realistic and constructive set of principles with which to assess a Body of Information may be *Transparency, Perspective, Judgment, and Fairness*. Questions to apply to a BOI, then, include the following:

- Is the information presented fairly?
- Are all perspectives of a story represented?
- If so, are there any differences in the way in which various perspectives have been represented?

VII. *Understanding the Capacity of a Medium to Convey Particular Kinds of Information.*

The final Line of Inquiry represents a direct convergence with the *Production Analysis Approach* to media literacy analysis, which examines a Body of Information in terms of its *presentation* of the content ([Silverblatt, 2014](#)). This approach is based on the supposition that the production decisions employed in the construction of media presentations convey distinct messages. Thus, production elements such as editing (what to include or omit), camera angle, color, and selection of images can reinforce the manifest message of the media communicator or convey independent, latent messages. As an example, the “shaky-cam” camera technique commonly employed in television commercials has an amateur appearance, conveying the impression that the program is spontaneous and authentic. Advertisers hope that this message of authenticity will be transferred, so that the audience believe what they are “told” about the product.

In addition, production elements can affect the audience’s receptivity to its content. Production elements are *affective* in nature; that is, audience members respond emotionally to elements such as lighting, color, camera position, and editing. For instance, media scholar Herbert Zettl maintains that the violent style found throughout American entertainment programming reinforces the violent content found in the programs:

It is of little surprise, therefore, that even ‘media-literate’ observers, while watching a hockey game with their children, might become concerned about promoting violence only when the game becomes especially rough or when the players begin to fight. However, they may not have noticed the perceptual violence of a series of quick zooms and high-volume sounds in the preceding cartoon of frolicking birds in a park.

...Television violence should now include aesthetic criteria, which may well reveal that aesthetic violence in an otherwise tranquil scene may be more damaging to the viewer than a fistfight between the good guys and the bad guys (Zettl, 1998).

Thus, the more welcoming the style of the presentation—such as putting information into rhymes, avoiding jargon that is difficult to pronounce, and employing visually friendly fonts--the more inclined people are to accept the content.

Each medium is defined by a set of distinctive characteristics that make it uniquely well suited to present certain types of information. To illustrate, in one of her weekly columns, Margaret Sullivan, Public Editor of the *New York Times*, cited a Letter to the Public Editor from David N. Schwartz, a reader who contended that there wasn’t a single “news story” on the front page of the November 26, 2014 edition of the *New York Times*. After conducting some research, M. Sullivan agreed with Schwartz’ assessment: “In general, I found an emphasis on interpretive and enterprise journalism. I also found many examples of interesting and well-written articles with little news value.”(Sullivan, 2014).

Sullivan then brought this observation to the attention of Managing Editor Dean Baquet, who agreed with Schwartz’ observation: “There’s no question that there’s less traditional news on the front than there used to be.” Baquet then explained, “One major reason... is that readers have constant access to breaking news.” (Cit: Sullivan, 2014). Baquet is making the point that, because of the ongoing nature of breaking news on the Internet, print media now are free to assume a “second-day” approach, selecting stories that put these events into perspective, opinion pieces, or articles that provide the “backstory” of a news story.

The following factors contribute to the distinctive characteristics of a channel of mass communication:

- The *Senses* involved in receiving information affect people’s ability to assimilate certain kinds of information of a medium, as well as the ways in which they respond to the content.
- The *Pace* of the presentation, which refers to the rhythm or rate at which information should be assimilated.
- The *Environment* in which the medium is presented can affect how an individual responds to a media presentation.
- *Dissemination Patterns*, which refer to 1) the amount of time it takes for information to be conveyed through a particular medium, and 2) the route that it takes to get to the public.

For instance, video coverage of the terrorist bombing in Belgium in March, 2016 presented events as they unfolded; at the same time, print coverage provided insight into essential context behind the attack.

Indeed, using an inappropriate medium to send a particular type of message may *interfere* with the communication process. Thus, to return to our example, relying on video to explain the geopolitical issues leading to the attack may only have confused the viewer. Consequently, one of the principles of media literacy involves the value of a *balanced media diet*, in which the audience uses media in combination to take advantage of the distinctive attributes of *each* medium to provide the audience with a comprehensive understanding of the news story.

Finally, a medium may lend itself to an individual’s particular *learning style*. For instance, dyslexia is a condition that impairs the brain’s ability to process written symbols. Consequently, dyslexic individuals who struggle with written communication often gravitate toward visual communications, such as photography and video.

4. Conclusion

Thus, the discipline of Information Literacy focuses attention on the most effective presentation of Information, based on: 1) the most suitable medium, given the nature of the BOI; and 2) the most effective channel for communicating with an individual audience member.

The following questions can provide insight into the impact of production elements on the presentation of a Body of Information:

- What production choices have been made by the media communicator?
- What messages are conveyed by these production choices?
- How do these production elements reinforce/convey media messages?
- Production Elements
 - a. Editing
 - 1) What information has been included?
 - 2) What information has been omitted?
 - b. Color: What meaning(s) are associated with the colors in the media presentation?
 - c. Lighting
 - 1) To what aspects of the media presentation does the lighting call attention?
 - 2) What message(s) are conveyed by the use of light and shadow?
 - d. Shape
 - 1) What shape(s) appear in the media presentation?
 - 2) What message(s) are conveyed by shape in the media presentation?
 - e. Scale: What theme(s) are conveyed by the relative size of objects in the presentation?
 - f. Relative Position: What message(s) are conveyed with regard to the relative position of objects in the presentation?
 - g. Movement
 - 1) What is the direction of movement in the media presentation?
 - 2) What does this movement signify?
 - h. Angle
 - 1) What angle(s) are employed in the media presentation?
 - 2) What messages are conveyed by the angle(s)?
 - i. Connotation
 - 1) Words
 - a) What is the connotation of words found in the media presentation?
 - b) How does the appearance of these words affect the message(s) in the media presentation?
 - 2) Images
 - a) What is the connotation of images found in the media presentation?
 - b) How does the appearance of these images affect the message(s) in the media presentation?
 - j. Performance
 - a) How do Nonverbal performance elements affect the meaning(s) in a presentation?
 - b) How do Verbal performance elements affect the meaning(s) in a presentation?
 - k. Sound Elements
 - 1) How does Music reflect/reinforce/shape meaning in the presentation?
 - 2) How does Dialogue reflect/reinforce/shape meaning in the presentation?
 - 3) How does Background Sound reflect/reinforce/shape meaning in the presentation?

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