

The Quality and Qualities of Information

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The paper discusses and analyzes the notion of information quality in terms of a pragmatic philosophy of language. It is argued that the notion of information quality is of great importance, and needs to be situated better within a sound philosophy of information to help frame information quality in a broader conceptual light. It is found that much research on information quality conceptualizes information quality as either an inherent property of the information itself, or as an individual mental construct of the users. The notion of information quality is often not situated within a philosophy of information. This paper outlines a conceptual framework in which information is regarded as a semiotic sign, and extends that notion with Paul Grice's pragmatic philosophy of language to provide a conversational notion of information quality that is contextual and tied to the notion of meaning.

Introduction

When selecting information, people must concern themselves with the quality of the information available. People are not interested in just any information; they request the best information available for their purpose. As noted by Wilson, a person wants “to have what we can call the *best textual means* to his end” (Wilson, 1968, p. 21). This fundamental challenge has drawn much attention lately, in the form of asking what makes information the best information available or exploring the nature of information quality. To further this endeavor, this paper presents a framework for understanding information quality based in a pragmatic philosophy of language. By doing so, it is shown that information quality is contextual to the particular situation in which the information is used.

The quality of information is—or so it is argued in this paper—closely tied to the meaning of information. The quality of information is something that exists or is developed in tandem with the meaning of information.

For the quality of information to be assessed, it must mean something to somebody in some context. Only information that means something to somebody can have a certain quality. Therefore, the conception of information quality must build on a philosophy of information, which in turn should be grounded in a philosophy of language that accounts for the concept of meaning. This paper develops an account of such an approach to information quality.

The specific conceptual foundation for this account is found in semiotics and more specifically in Paul Grice's pragmatic philosophy of language. This paper explores the philosophy of information to develop a conception of information as sign, which is extended with Grice's distinction between natural and non-natural meaning and his conversational maxims. In light of this conceptual understanding, this paper reviews work on information quality and develops an understanding of information quality as embedded in conversation. Specifically, this paper argues that information quality is context-dependent, and can only be assessed and understood from within specific situations and circumstances.

This paper consists of four main sections: one that develops a semiotic philosophy of information; one that reviews conceptualizations of information quality; one that presents and explains Grice's philosophy of language; and lastly, one that introduces a conversational notion of information quality that builds on a semiotic understanding of information. Extended with Grice's conversational maxims, this lays the ground for a framework to understand information quality as situational and located in context.

The Qualities of Information

As an initial step in the analysis of the notion of information quality, the notion of information itself must be explored. Before understanding how information can be of high, low, or no quality, first a firm understanding of what information is needs to be developed. In other words, to fully appreciate the great importance of information quality, the notion needs to be situated within a sound philosophy of information. The following will explore the properties, the

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qualities as it were, of information, to establish a notion of information for information studies that views the field as being concerned with the exchange and construction of meaning.

It seems to be a fact that more and more people are burdened by information overload, and it also seems to be a fact that there exists more information than ever. To explore these ideas, we can distinguish between two primary types of information: (1) that which is usually measured by number of bits, gigabytes, terabytes, etc. (e.g., “The Library of Congress contains 10 terabytes of information”), and (2) another type that is usually measured by reference to people’s psychological states (e.g., “I am overwhelmed by all the information about the economic meltdown”).

Those concerned with the first kind of information are typically focused on the amount of information being transferred. Those concerned with the second kind of information are typically focused on the transfer of messages between people—and that is the kind of information I will focus on here. We can further subdivide this group into: (i) those who are mostly concerned with the systems that facilitate the transmission of messages, and (ii) those who are mostly concerned with the meaning of the messages being transferred.

To distinguish between concern with systems for transmission and concern for the meaning of messages, these two schools of thought on information and communication can be conceptualized as the process school and the semiotics school. The “process school” is concerned with transmission of messages and the “semiotics school” is concerned with the production and exchange of meaning (Fiske, 2011, p. 3).

The process school focuses on the efficiency and accuracy of the transmission of messages and on the actual act of communication, assuming that “the message is what the sender puts into it by whatever means” (Fiske, 2011, p. 3). Shannon’s information theory is the prime example of a theory within the process school. The semiotics school, on the other hand, focuses on the production and exchange of meanings: On signification, text and culture, and on works of communication, emphasizing that “the message is a construction of signs” (Fiske, 2011, p. 3). The notion of information is conceptualized differently in these two schools. In the process school, information is a substance that is transported between the sender and the receiver. In the semiotics school, information is something that is used to produce and exchange meaning, and, implicitly or explicitly, conceptualized as a sign.

Information studies—or rather, classic information studies—is concerned with the production, organization, retrieval, and use of information. And in this context information is thought of as being more or less equivalent to documents—or more precisely as the ideas, opinions, claims, or facts represented or expressed in books, journal papers, newspapers, photos, films, webpages, etc. In other words, the kind of information studied in information studies is typically information created by people to communicate with other people about something. It could be

intended to tell something, to argue something, to inform about something, to convince someone about something, to state something, etc. In any event, it is produced with the intention to create some meaning for the receiver of the information. In this sense information can be thought of as a vehicle in a communications process.

Using the distinction between process school and semiotics school, we can outline the principal differences between their approaches to information in information studies. One approach is concerned with information as a substance that is transferred via a vehicle through information systems connecting producers to users. This approach concerns itself less with the meaning of the information, and more with the vehicle that serves as a carrier of information or information-bearing object. In this approach, meaning is transferred from one point to another, and the primary concern is with how information gets there most efficiently and effectively. In the other main approach to information studies, the vehicle is viewed as an object that is subject to interpretation. This approach concerns itself with the production and exchange of meaning between groups, focusing on the exchange of information and what it means to people. The focus is often on the interpretative nature of the production, organization, retrieval, and use of information.

Hjørland (2007, p. 1449) has drawn a similar distinction between what he argues are the two basic views of information:

1. The objective understanding (observer independent, situation independent). Versions of this view have been put forward by, for example, Parker, Dretske, Stonier and Bates. Bates’s version implies: Any difference is information.
2. The subjective/situational understanding (observer dependent, situation dependent). Versions have been put forward by, for example, Bateson, Yovits, Spang-Hanssen, Brier, Buckland, Goguen, and Hjørland. This position implies: Information is a difference that makes a difference (for somebody or for something or from a point of view).

Hjørland finds that the former, the objective understanding, has “a much stronger appeal than theoretical views that make information, meaning, and decisions context dependent” (p. 1455) and as such has gained a stronger ground in information studies. When Brookes (1980) formulated his “fundamental equation”¹ (p. 131) for information science it was with the intent to develop a foundation that permitted “an *objective* rather than a *subjective* theory of knowledge” (p. 127) and in which “information and knowledge are of the same kind” (p. 131) so that they can “be measured in the same units” (p. 131). This understanding allows one to jump from information as bits to information overload as if they

¹The “fundamental equation $K[S] + \Delta I = K[S + \Delta S]$. . . states in its very general way that the knowledge structure $K[S]$ is changed to the new modified structure $K[S + \Delta S]$ by the information ΔI , the ΔS indicating the effect of the modification” (Brookes, 1980, p. 131).

were of the same kind. This conception has given rise to the “conduit metaphor” in which “information is the flow and exchange of a message, originating from one speaker, mind, or source and received by another” (Day, 2001, p. 38). This approach and understanding of information is (Day, 2008, p. 1644):

... a well-established tradition of library- and information-science theory ... that understands ideas as being quasiempirical objects—generated in the minds of authors—that are contained in documents and that are sought by and transferred to the minds of information seekers or users upon reading, viewing, or listening.

Information studies’ cognitive turn in the late-1970s and early-1980s supposedly moved research in information studies “toward the state of mind of the user” (Cornelius, 2002, p. 406) and therefore closer to the notion of meaning, and away from the notion that information and knowledge are of the same kind. However, there continues to be “disagreement on how meaning can be inferred, whether it can be measured, and how its nature is to be defined” (Cornelius, 2002, p. 407). Within the cognitive viewpoint, it has sometimes been argued that information goes beyond meaning (Ingwersen, 1992, p. 25; Ingwersen & Järvelin, 2005, p. 162), which has allowed scholarship about people’s interactions with information to avoid discussion of how people create meaning with information. One analysis of the notion of meaning in information studies argues that the notion of meaning could be taken to be different in philosophy than within information studies (Thornley & Gibb, 2009).

This “‘water into wine’ effect of changing information into knowledge is not sufficiently explained” (Cornelius, 2002, p. 408), and seems to be seldom discussed, defended, or conceptualized within the information studies literature. There are few defenses available of such epistemic positions in the information studies literature (Furner, 2010).

It is my sense that information studies needs to consider the interplay between the notion of information and the notion of meaning in a more constructive manner, and take seriously the fact that information studies at its heart is concerned with the communication of ideas, claims, and thoughts. Hjørland’s second approach to information, the subjective/situational understanding, stresses the fact that information is indeed about ideas and claims, and makes the point that ideas and claims will mean different things in different communities.

Qvortup (1993) reviews the notion of information, and argues that (p. 3):

The basic problem seems to be that since the 1940s it [information] has aimed at becoming a natural science concept, an objective thing, a substance, a “Ding an sich.” But every time it has been close to becoming a decent, objective concept it has been caught up by its fate that information is a concept which implies a human subject. Information isn’t just information in itself; it only becomes information when it is information *to somebody*, i.e. as a mental construction.

Using this spectrum between information as an objective entity and information as a sign that generates meaning, Qvortup (1993) develops a taxonomy that distinguishes four primary approaches to information:

1. “*a difference in reality*,” “something (a thing or a substance) existing in the external world” (p.3),
2. “*a difference which makes a difference*,” “something in the external world which causes a change in the psychic system” (p. 4),
3. “*a difference which finds a difference*,” “a change in the psychic system which has been stimulated by a change in the external world” (p. 4),
4. “a cognitive difference which brings forth (an idea about) an external world,” “something only in the human mind, a concept or an idea” (p. 4).

The first conceptualization follows the Shannon tradition of information theory and applies the “conduit metaphor,” which regards information as a substance that flows in cybernetic systems. In the last of the four categories “information is the observer’s construction” (Fiske, 2011, p. 12) and as such allows for a purely solipsistic conception of information.

Between those two extremes is the important distinction between information as a difference that *makes* a difference and information as a difference that *finds* a difference. In the former conceptualization, information is viewed as something that has the ability or power to “bring about an operational change—a difference—in the observing system” (Fiske, 2011, p. 10). This is similar to Brookes’s notion of information as something that is brought into a person’s knowledge structure and changes that knowledge structure. It is also in line with Hjørland’s description of the objective approach to information, which positions the ability to make change, to create a difference with the observer/receiver, alongside of the information as it exists in the external world. The person observing/receiving the information plays no active role in creating such difference; information remains “observer independent, situation independent” (Hjørland, 2007, p. 1449).

In the latter conceptualization, Qvortup (1993) suggests that information is viewed as a difference that finds a difference. The ability to create a difference—meaning—is thereby moved from the information itself as it exists in the external world, and attributed instead to the observer/receiver. In this tradition, “information can be defined as a mental difference which *finds* or is confirmed or stimulated by a difference in the world” (p. 13). This tradition comes closer to Hjørland’s subjective/situational understanding of information where information is a difference “for somebody or for something or from a point of view” (Hjørland, 2007, p. 1449), and is in line with the semiotics school of information and communication as it concerns itself with the production and exchange of meaning.

Where Qvortup (1993) highlights the epistemological differences between these four basic approaches to information, Floridi takes an ontological approach and outlines different categories of information. Floridi explicitly limits

himself to “fields that treat data and information as reified entities, that is, stuff that can be manipulated (consider, for example, the now common expressions ‘data mining’ and ‘information management’)” (Floridi, 2010, p. 20). This approach to information is based on a fundamental understanding of information, which Floridi calls the “General Definition of Information” (p. 21) that defines information as “data + meaning” (p. 20). Floridi concedes that the process by which meaning can be added to data and become information “is one of the hardest questions in semantics” (p. 20–21) but he notes that for his purpose the problem can “be disregarded” (p. 21). Hence, he constitutes information as “meaningful independent of an informee” (p. 22) and as such establishes a notion of information that does not rely on a knowing subject.

Floridi suggests that information can be viewed from three perspectives: “information as reality (e.g. as patterns of physical signals, which are neither true nor false). . . ; information about reality (semantic information, which is alethically qualifiable and an ingredient in the constitution of knowledge); and information for reality (instruction, like genetic information, algorithms and recipes)” (Floridi, 2008, p. 118). From an information studies viewpoint, semantic information, information about reality, is the most important of his three categories. Semantic information is defined as factual information that, if true, can lead to knowledge, and, as such, “knowledge and information are members of the same conceptual family” (Floridi, 2010, p. 51). Where Brookes described information and knowledge as being of the same kind, permitting measurement of them in the same units, Floridi (2008) conceptualizes information and knowledge as related in the sense that knowledge can be assembled into a “network of relations” (p. 51) that is constructed of “explanations or accounts that make sense of the available semantic information” (p. 51). This conceptualization of knowledge is one in which pieces of information are used to “build or reconstruct” (p. 51) knowledge.

In contrast, Dretske (2008, p. 31) finds that, “Information is . . . different from knowledge” and as such his conception of the relationship between information and knowledge is different from Brookes’ and Floridi’s views. Dretske considers information to be objective in the sense that “it is independent of what we think or believe. It is independent of what we know” (p. 31). Information exists to be used, but the existence of information does not depend on conscious beings, whereas the existence of knowledge does depend on conscious beings, because “without life there is no knowledge (because there is nobody to know anything), but there is still information” (p. 31). Dretske limits the notion of information to “true answers” (p. 29) that can be verified empirically; information is empirical facts. Floridi, on the other hand, views data as the basic building blocks for information; information (typically, but not always) consists of data. In that sense, what Floridi considers to be data comes close to what Dretske considers information to be.

Floridi’s conceptualization follows the popular notion that *data + meaning = information*, and that information

together with some other information creates knowledge. The basic challenge of this is, of course, that it disregards the “symbol grounding problem” (Floridi, 2010, p. 22). That problem is concerned with how one person understands another. The classic approach to the symbol grounding problem assumes that one person codes a message and another person decodes it. There are several different theories of language that explain how the coding/decoding takes place, each theory offering specific implications of what would happen in the data-information-knowledge model. To fully appreciate the data-information-knowledge model, the symbol grounding problem needs to be addressed. The data-information-knowledge model conceptualizes meaning as something that can be added to data (to create information) and it thereby follows the notion of meaning as something that exists independently and which can be added when and where applicable. This conceptualization of information and data allows for a dichotomy where meaning is thought of as an entity separate from language and words; a dichotomy that has been criticized by many philosophers of language starting with the later Wittgenstein (1958).

Furner (2004) has considered in detail the philosophy of information from the perspective of philosophy of language. He suggests that philosophers of language have modeled phenomena central to communication in such a manner that if information studies was to apply these philosophy of language concepts, information studies would not need to “commit to a separate concept of ‘information’” (p. 428). Instead, Furner proposes that what is meant by various usages of the term could be described using terminology from the philosophy of language to describe utterances, thoughts, situations, communication, informativeness, and relevance. These are concepts that philosophers of language have developed to explore “the meaning of ‘meaning’” (p. 430) and each have different “hooks” into an actual state of affairs as it were—offering different understandings of the nature of information. Furner’s analysis demonstrates “how labels other than ‘information’ have been used to effectively distinguish between” (p. 443) different types of activity that involve the communication of meaning. Furner finds that the “nature of information that is commonly assumed in the IS literature—that of the thought as information” requires one to seek “answers in the literature of cognitive psychology” (p. 444). Other conceptions of information would necessitate that one looks elsewhere but always with the understanding that “a good theory of meaning should do more than explain what it is to say that a signal is meaningful. It needs to explain how a person assigns a particular meaning to a given signal” (p. 443).

Blair (1992, 2003) has similarly explored the use of philosophy of language in information studies, though he focused more specifically on information retrieval, and was concerned primarily with enhancing the understanding of information retrieval as a linguistic process. Blair rejects the “water into wine” transformation of information into knowledge that dominates much information studies research, and instead suggests using Wittgenstein’s philosophy of

language as the foundation for understanding information retrieval. The basic point is that “meaning must be something other than simple reference” (Blair, 2003, p. 18). In traditional theories of meaning,² meaning is seen as something that “can exist independently of words—it appears to be something that can be added to words” (p. 18), in a way similar to how some philosophers of information assume that meaning can be added to data to create information. Blair, following Wittgenstein, seeks to establish the meaning of words in the usages of the words. Meanings of particular words are thereby tied to the individual contexts in which they are used, and as such are not something that transcends time and space.

Blair looks to Paul Grice for a way to talk about information retrieval as a conversation. He notes, “the process of describing what we want and evaluating what we retrieve is a lot like a conversation” (2003, p. 29). By focusing on information retrieval as a meaning-making process, and having a formal theory of language that ties meaning to usages, Blair proposes contemporary philosophies of language as the concrete foundation for information study research.

Both Furner and Blair employ a conception of information as something that is meaningful to particular informees, in contrast to Brookes’s, Floridi’s, and Dretske’s conceptions of information as something that can exist independently of a knowing human. In this sense, Furner and Blair are in line with Qvortrup’s notion of information as something that finds a difference and Hjørland’s conception of information as subjective/situational. The interplay—or interrelation—between data, information, and knowledge that Floridi sees as foundational becomes less of an issue. Furthermore, instead of conceptualizing data (1) as building blocks for information (after Floridi), (2) as being of the same nature as information to allow for unified measurements (after Brookes), or (3) as being different from information in order to establish information as what is true and verifiable (after Dretske), these scholars view information as a vehicle used in the production and exchange of meaning. They base their understanding of information and communication in the semiotics school, and as such establish foundations for both the philosophy of information and information studies that focus on the interpretive nature of the production, organization, retrieval, and use of information.

Information as Signs

A number of scholars (e.g., Brier, 2004; Raber & Budd, 2003; Warner, 1990) have previously suggested establishing the foundation of information studies in semiotics. Common to these calls is an understanding of information as signs used in communication to produce and exchange meaning.

²The two most common traditional theories of meaning are the Ideational Theory and the Proposition Theory. Ideational theory holds that meanings are mental states that exist in the mind of individual people and proposition theory holds that meanings are language and people independent (Lycan, 2008).

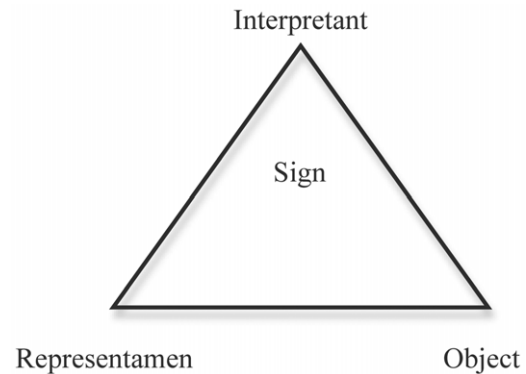


FIG. 1. Peircean sign.

I will outline a basic and general understanding of semiotics and signs, which will lead to a conception of information as signs.

A basic understanding of the notion of a sign sees a sign as something that is taken to refer to something other than itself. Eco (1984, p. 46) said, “a sign is not only something that stands for something else; it is also something that can and must be interpreted.” Peirce developed a more elaborate conceptualization of the basic idea expressed by Eco. Peirce (1955, p. 99) formulated the sign as a triadic relationship,

A sign, or representamen, is something that stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign. That sign which it creates I call the interpretant of the first sign. The sign stands for something, its object. It stands for that object, not in all respects, but in reference to a sort of idea, which I sometimes have called the ground of the representamen.

This idea can be expressed as in Figure 1, which illustrates the interrelation between the three components of the sign: The interpretant, the representamen, and the object.

Peircean semiotics distinguishes the sign vehicle (called the representamen), words for instance, from what those words refer to (called the object), and the meaning one derives from the words (called the interpretant). Meaning, therefore is not “an absolute, static concept to be found neatly parceled up in the message” (Fiske, 2011, p. 43), as it is found in the process school with its objective understanding of information. In semiotics meaning is an “active process” (Fiske, 2011, p. 43). When referring to this process, “semioticians use verbs like create, generate, or negotiate” (Fiske, 2011, p. 44), which highlight the role of the receiver in that “the receiver, or reader, is seen as playing a much more active role than in most process models” (Fiske, 2011, p. 38).

The relationship between the three entities in the sign is not one that is fixed once and for all, and it does not stay stable across cultures and contexts. The relationship remains relative in the sense that it is established to do particular things. For some signs, the relation is established only for a

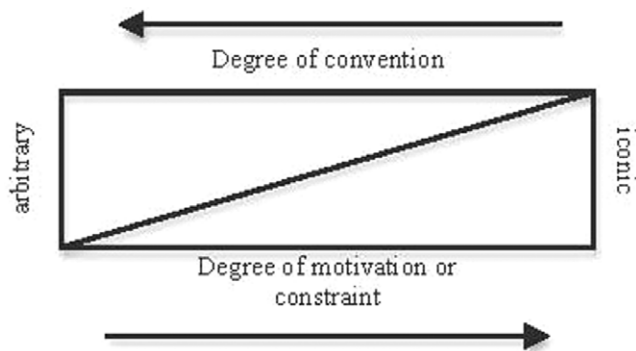


FIG. 2. Scale of convention and motivation (Fiske, 2011, p. 51).

particular immediate context, whereas for others the relation cuts across several situational and temporal contexts. One way to express the difference is to say that some signs are more *arbitrary* and others are more *iconic*. The meaning of arbitrary signs is established by “convention, rule, or agreement among the users” (Fiske, 2011, p. 50), whereas an iconic sign “bears a resemblance to its object” (Fiske, 2011, p. 45). An arbitrary sign’s meaning is established through a high degree of convention, and people using the sign share an agreement about its correct use and understanding. While the same sign can be applied across different cultures and contexts, the meaning of the sign is established by, and is connected to, the particular cultures and contexts. At the other end of the spectrum, iconic signs resemble their objects, and as such their meanings are more natural in the sense that they often mean that which they are a sign of, and are more independent of cultures, conventions, and agreements. We can therefore say that iconic signs are highly motivated or constrained by their objects and that arbitrary signs are established by conventions.

These two kinds of signs, arbitrary and iconic, are at each end of a spectrum of possible signs, and with many kinds of signs in this spectrum, each of which consists of elements of arbitrariness and iconicness. This spectrum is illustrated in Figure 2.

Most signs embody some degree of convention, and given that words are arbitrary signs, language and communication usually consist of signs that are closer to the arbitrary end of the spectrum. Some signs—like rings in a tree, DNA, and frost on glass—might be closer to the iconic end of the spectrum. To use and understand signs that are closer to the arbitrary end of the spectrum, conventions are “necessary to the understanding” (Fiske, 2011, p. 51) of the sign; we need to learn how to understand a particular sign, which is a social and shared process. Convention, therefore, “is the social dimension of signs: it is the agreement amongst users about the appropriate uses of and responses to a sign” (Fiske, 2011, p. 51). In other words, the meaning of signs based on conventions have been established and negotiated in social, communal relationships among people.

We can now develop a general conception of information as signs that ranges from iconic to arbitrary. Following

Furner’s suggestion, we can next exchange the notion of information with the notion of sign at a very general level of the philosophy of information.

At the same time, to better focus on information studies’s concern with the production, organization, retrieval, and use of information, we can limit the conception of information as sign to the arbitrary end of the spectrum. This definition offers practical advantages in the debate about information in information studies. Blair and others have argued that the production, organization, retrieval, and use of information is fundamentally a linguistic challenge, and as such a foundation of information in the semiotics school should generally enhance the application of information systems and services.

The focus of this paper is on the application of the notion of information as signs in establishing an understanding of the quality of information. In the next section, I will explore how information has been conceptualized in the information quality literature.

The Quality of Information

When information is used to communicate and exchange ideas, it is important that the information can be trusted, meaning typically that it is of good quality. Unlike those who are in the business of deliberately distributing disinformation, information professionals are interested in giving access to and using information of high quality. People in the information production-organization-retrieval-use business have long advocated on behalf of information quality and are rightly concerned about the design and maintenance of systems and services that provide access to information of good quality.

While it does seem that the quality of information is—or should be—an issue of concern to the population at large, it must “also be acknowledged that there is a danger of some issues being, at least in part, the creation of over-zealous information specialists, seeking problems to which they can provide the solutions” (Bawden & Robinson, 2009, p. 181). It is important to articulate information problems in a larger context; avoiding the danger of inventing information problems for which the only solution is “the services of library/information professions” (Bawden & Robinson, 2009, p. 181). I suggest that to avoid casting the notion of information quality among such “pathologies of information” (Bawden & Robinson, 2009, p. 181), the notion of information quality should be addressed in a broader view. In particular, it needs to be tied to and build on a solid philosophy of information.

Unfortunately, most of the literature on information quality casts a rather narrow conceptual net when it problematizes the notion. Information quality is often defined or conceptualized as an intrinsic quality that information itself possesses regardless of situation and context; it is assumed that information quality can be assessed based on an evaluation of the information itself. When discussing extrinsic qualities, answers to questions such as: “Who said it? Who wrote it? What is the source of this information?”

TABLE 1. Attributes of information quality.

– accurate
– appropriate
– authentic
– authoritative
– balanced
– believable
– complete
– comprehensive
– correct
– credible
– current
– good
– neutral
– relevant
– reliable
– objective
– true
– trustworthy
– understandable
– useful
– usability
– valid

(Fink-Shamit & Bar-Ilan, 2008) are assumed to signal the level of information's quality (e.g., "The author is a doctor, so the information must be valid").

The notion of information quality often goes undefined in these studies; scholars in the area typically note that "quality is an elusive concept" (Fink-Shamit & Bar-Ilan, 2008) and instead articulate a set of attributes that make up information quality. Chesney (2006), for instance, notes that, "information with high quality is usually considered to have some or all of the following characteristics: Up-to-date, relevant, accurate, economic for the purpose at hand, on time and understandable to the person who needs it." Arazy & Kopak (2011) asked students to rate information in terms of "quality (e.g. accuracy, completeness, objectivity, and representation)" (p. 90), and Rieh (2002) drew on previous research on relevance to look for "goodness, usefulness, accuracy/validity, recency, perceived quality, actual quality, expected quality, authority, and reliability" (p. 145). Table 1 lists a number of attributes that have been associated with or considered definitional for information quality. Each of these concepts has, of course, multiple meanings and interpretations; simply pointing to any set of such attributes in an effort to define information quality seems less than helpful.

While many writers in the area argue that information quality ultimately is a subjective construct, and that "users of the information have to make judgments about its quality for themselves" (Knight & Burn, 2005, p. 163), at the same time the focus of much research is on "quantifying" (Knight & Burn, 2005, p. 163), "measurement" (Arazy & Kopak, 2011, p. 90), or the determination of "a true quality control measure" (Fink-Shamit & Bar-Ilan, 2008) for information quality. Some assume that information quality is a subjective construct (in the mind of the individual information user),

but simultaneously believe that "some dimensions may be less context-sensitive (e.g. less task-dependent), relying more on intrinsic indicators that span across all tasks" (Arazy & Kopak, 2011, p. 90). Research focused on identifying objective characteristics that create high quality information often aims at helping design better information services on the web.

Rieh (2002) suggests that the judgment of information quality on the web is different from that in traditional printed publications, because "there is generally no quality control mechanism for the web" (p. 146), whereas for printed publications "people can judge the quality ... with little difficulty because they have accumulated knowledge and experiences with traditional information resources that make use of conventional indicators of quality (e.g. editorial selection) and authority (e.g. authors, publishers, and document type)" (p. 146). The notion that the shift to web-based information somehow creates different conditions for the assessment of information quality runs through much of the literature on information quality. Fink-Shamit and Bar-Ilan (2008) find that, "in the conventional publishing process the information not only goes through quality assessment, but it is also subject to a publication policy whereas, over the Internet, the publishing process allows almost anyone to quickly and easily publish his or her opinions." Arazy and Kopak (2011) suggest that with the "diminution of traditional gatekeeping on the 'information production' side (e.g. editorial and peer-review processes), more and more of the available content is obtained from sources with mixed, and sometimes dubious, provenance" (p. 89).

In general, what these authors suggest is that information published by established publishing houses, through established publication channels, has gone through a peer-review or an editorial process, and therefore should, or ought to, be considered of high quality. The argument is that someone, somewhere has decided that the information is of high quality and that we, the information users, need not question the information's quality because established institutions have judged the information's quality. Lucassen and Schraagen (2011, p. 1232) highlight this point when they find that, "Online information is not less credible, per se, but users should be aware of the possibility of encountering low-quality information." The danger of encountering such low-quality information was lower in past days when "the verification of information credibility ... was mostly performed by professionals" (p. 1232). It is curious that investigations of the quality of information seem more or less to blindly accept those institutions' judgments of quality, and establish the notion of information quality as a challenge only in situations where those institutions are absent.

One case that has been investigated by a number of writers is Wikipedia. This is of particular interest because Wikipedia presents itself as an encyclopedia, which in the printed tradition is the paradigmatic example of a publication of high quality; encyclopedias are typically taken to possess many of the attributes listed in the table above. Wikipedia is considered to possess many of the virtues that

are associated with the web as we know it today, being democratic, open, up-to-date, accessible, and interactive. Wikipedia also possesses many of the virtues listed in Table 1. The issue of information quality in Wikipedia becomes an issue when the traditional criteria for information quality (editorial selection, gatekeeping, peer-review) are applied, as these criteria do not disappear but are redefined and challenged.

Lim (2009) found that undergraduate students use Wikipedia and have a positive experience doing so, though they “tended not to expect to find the best information” (p. 2199) there. Lim’s focus is not on the quality of information in Wikipedia per se, but on how the students “perceive its information quality” (p. 2189). He found that while the students “held a moderate perception regarding the information quality” (p. 2195)—or “did not perceive Wikipedia’s information quality highly” (p. 2195)—they somehow “knew to be skeptical about its information quality” (p. 2195). Stvillia, Twidale, Smith, and Gasser (2008) were more optimistic about Wikipedia’s information quality in their exploration of Wikipedia editors’ understanding and handling of information quality. While acknowledging that information quality is “context sensitive” (p. 983) and a “social construct” (p. 995), they found that the editors and Wikipedia’s quality assurance procedures together create a system “that is robust and that promotes continuous IQ [information quality] improvement” (p. 1000). Luyt and Tan (2010) focused on one measure of quality of Wikipedia articles, namely the reference and citation practice. They find that “Wikipedia is not living up to its own policy goals” (p. 719), that many claims are “not verified through citations” (p. 721), that editors “rely heavily on Internet sources” (p. 719), and that many of the sources are U.S. government or news sites, and “few are academic journal material” (p. 721). The authors are concerned that their findings paint a “dismal” (p. 715, 718, 721) picture of the encyclopedia’s credibility, but they suggest that instead of dismissing Wikipedia altogether, one needs to consider the larger social context within which knowledge is created and communicated.

Fallis (2008) has more thoroughly considered the epistemology of Wikipedia, and while he supports and echoes many of the issues brought forward by other researchers, he takes a broader and more inclusive view of the issues. Fallis finds that the challenge with Wikipedia can be summed up in three main categories of problems generated by Wikipedia’s open design. Given that anyone can contribute to Wikipedia, there might be people who lack expertise and insight in a particular area, which can lead to *misinformation*, there might be people with particular agendas who want to deceive by distributing *disinformation*, and there is evidence that experts are less likely to contribute, suggesting “that Wikipedia exhibits *anti-intellectualism*” (p. 1665). Fallis argues that ensuring the quality of entries in Wikipedia could involve (a) incorporating a rating system that would take advantage of the wisdom of crowds and indicate the entries’ quality, (b) letting experts link to authoritative sources, (c) including some indication of the types of entries that are

typically problematic, and (d) building a better process for flagging incomplete entries.

Wikipedia highlights the challenges of information quality in the modern digital information society. While the service is open to anyone to contribute and lacks the traditional quality gatekeepers and control of information, the service actually works. Despite having certain epistemic challenges it is often a trusted, credible source of good quality.

While not speaking directly about the notion of information quality, Lankes (2008) wants to move the understanding of the credibility of information from its current site in concepts of authority to a more dynamic position of reliability. Lankes understands the credibility of information to be determined by “the individual receiving the information” (p. 669), and as such applies a mentalistic and individualistic construct that does not depend on external factors such as the information received, or the context in which the information is received. He argues that, “reliability and authority can be seen as opposite ends of a spectrum of credibility approaches” (p. 681). At one end of the spectrum we have authority where “pre-existing agreements are in place and assumed: the conversation is over” (p. 681), and at the other end of the spectrum we have “reliability [where] the conversation is open and ongoing” (p. 681). Lankes argues that tools must be developed that help “users find and use credible information” (p. 681). Lankes walks the fine line between defining credibility as an inherent property of information, on the one hand, and on the other developing an understanding of credibility that is solipsistic and divorced from social interactions and contexts. In an effort to overcome this challenging balancing act, Hilligoss and Rieh (2008) propose a unified framework to understand users’ assessment of credibility. They find that the assessment can be broken into three levels:

1. the conceptualization of credibility employed by the person [truthfulness, believability, trustworthiness, objectivity, reliability].
2. the general rules of thumb employed.
3. specific cues from source or content.

They further found that “context emerged as an important factor that influences the three levels” (p. 1481). Given their focus on the individual user in the study, the authors do not consider the contextual dimension in much detail, and as such their unified framework focuses mostly on one aspect of credibility assessment. Savolainen (2011) splits the balancing act into two components, quality and credibility, by restricting information quality to “the message’s information content” (p. 1254) and information credibility to “the qualities of the author of the message” (p. 1254).

The operation of information reliability, authority, trust, and quality could be understood within the larger context of information literacy. When people seek information of high quality they do so within a complex web of information problems, information-interactions, and social and cultural contexts. As Andersen (2006) shows, some work in information literacy tends to limit itself to technicalities and a narrow focus on library procedures, but the notion of

information literacy, he argues, needs to be considered in a broader context (p. 226),

Information literacy covers ... the ability to read society and its textually and genre-mediated structures. Information literacy represents an understanding of society and its textual mediation. We might go as far as to say that information literacy implies a critique of society insofar as it includes a particular use and reading of particular information sources and use of particular forms of communication.

One aspect of this understanding of information literacy is the ability to assess the quality of information. Such assessment will always be driven by the particular context, and within a particular understanding of the society in which the information is used, and as such remains centered on the meaning of that information.

While inquiries into the nature of information quality have highlighted some of the complexities that are bound up in the concept, to appreciate the notion more fully, inquiries need to be based on a conceptual foundation that explicitly deals with information as signs, meaning, and language. We need a different way to think about information, information quality, and information literacy that allows for such distinctions, as Bawden (2001, p. 251) notes:

To deal with the complexities of the current information environment, a complex and broad form of literacy is required. ... Understanding, meaning and context must be central to it. It is not of importance whether this is called information literacy, digital literacy, or simply literacy for an information age. What is important is that it be actively promoted as a central core of principles and practice of the information sciences.

It is clear that a more sophisticated conceptual framework is needed for dealing with the notions of understanding, meaning, and context in information interactions; for framing the various qualities of information; and especially for establishing a better notion of information quality. In other words, we need to understand what it means to have a meaningful conversation.

Meaningful Conversations

It is helpful to look to Paul Grice's pragmatic philosophy of language to understand the qualities of information and how it facilitates communication and meaning exchange. The following will present Grice's philosophy of language with specific focus on his conceptualization of meaning and his maxims of conversation.³

³For simplicity I am using the version of Grice's papers as they are printed in his collection of papers, *Studies in the Way of Words*, from 1989, but I give the original publication date for papers to indicate the time framework in which the papers were first made publically available. Many of the papers were given years prior to the first publication, so a true indication of the intellectual context in which the papers were produced is not provided. I refer readers to biographies of Paul Grice, for instance Chapman's "Paul Grice: Philosopher and Linguist," 2005.

In a groundbreaking paper, first published in 1957, Grice distinguishes between "natural meaning" and "non-natural meaning." Early on in the essay he notes the connections to earlier work on semiotics (p. 215):

This question about the distinction between natural and non-natural meaning is, I think, what people are getting at when they display an interest in a distinction between "natural" and "conventional" signs. But I think my formulation is better.

As Grice's biographer notes, "the mention of 'people' is not backed up by any specific references" (Chapman, 2005, p. 71), but based on notes and papers that Grice kept with him throughout his life, it seems clear "that Grice's account of meaning developed in part from his reaction to Peirce, whose general approach would have appealed to him" (p. 71). For this reason, we can view the discussion above of semiotics and information-as-sign as being further developed by Grice's notions of meaning, and in particular in helping to understand how that notion of meaning plays out in conversation. In other words, Grice's philosophy of language will help articulate more precise conceptualizations of "information as sign" facilitating a pragmatic understanding of the notion of information quality.

Within information study, Blair (1992, 2003) has previously used Grice's work to enhance understanding of the information retrieval process. Blair outlined how information retrieval could be conceptualized as a conversation in which meaning and understanding are negotiated. The present discussion follows, but expands upon, Blair's initial introduction of Grice to information studies.

The first basic step to understanding Grice's work is to appreciate his notions of natural and non-natural meaning. Grice (1957) defines "natural meaning" as utterances that entail some kind of fact. He gives the example (p. 213):

- (1) "Those spots mean (meant) measles."

If someone utters that sentence, we would rightly expect that there is an actual correlation to a state of affairs in which certain spots entail that someone has the measles. In other words, it would be strange if someone said: "Those spots meant measles, but he hadn't got measles" (p. 213); if someone has these particular spots, then someone has the measles. Compare that to Grice's example of "non-natural meaning" (p. 214):

- (2) "Those three rings on the bell (of the bus) mean that the bus is full."

This utterance does not in the same way entail a particular state of affairs. One could very reasonably "go on and say, 'But it isn't in fact full — the conductor made a mistake'" (p. 214). In this instance, *someone* has the intention of communicating something; there is a human agent present, and that agent can be correct or incorrect in his/her understanding of the actual state of affairs. This is, as Grice, notes

“overrigid; but it will serve as an indication” (p. 215). As he further explains (p. 215):

I do not want to maintain that *all* our uses of “mean” fall easily, obviously, and tidily into one of the two groups I have distinguished; but I think that in most cases we should be at least fairly strongly inclined to assimilate a use of “mean” to one group rather than to the other.

It has caused a bit of confusion that Grice used the term *natural* to distinguish between the two kinds of meaning. It might have been easier to grasp Grice’s idea if he had focused on the purpose or goal of the speaker (Morris, 2007, p. 250):

The argument will become easier to see when we realize that it’s not really a distinction between what is and what is not *natural* which provides the basis of the differences which Grice finds between cases like (1), on the one hand, and (2), on the other. The real difference between (1) and (2) lies, I think in the fact that (2) expresses a *teleological* conception of meaning, whereas (1) does not.

Grice aims to divide meaning into two different kinds of phenomena: one that merely points to an actual state of affairs, and another that allows for interpretation and situational understanding. In (2) the utterance is supposed to show something, in this instance that the bus is full; it is clear that someone has the intention of communicating that the bus is full, and we can reasonably accept that the person could be wrong, even while making the utterance in good faith.

Later, Grice (1982) formulated a couple of “recognition tests” (p. 291) to help determine which sense of meaning is applicable to particular situations. “[T]he tests were, roughly speaking, that the nonnatural cases of meaning, cases which are related to communication, are what we might call non-factive, whereas the natural cases are factive” (p. 291). The basic idea behind these tests is to see whether the speaker can commit to the utterance actually being the case. For natural meaning the speaker would be able to commit to this, whereas for non-natural meaning the speaker might have doubts.

Dretske suggests using Grice’s notion of natural and non-natural meaning to delimit the notion of information. He notes that: “Information (once again as it is commonly conceived) is something closely related to what natural signs and indicators provide” (Dretske, 2008, p. 30). The reason for this focus can be found in the fact that Dretske constrains the notion of information to include only “answers to questions” (p. 29), and further constrains the types of questions to those that can have verifiable answers, “not just any answers ... [but] true answers” (p. 29). According to Dretske, the notion of information should not be limited by the notion of meaning, though, as he says, “meaning is fine. You can’t have truth without it” (p. 29). Dretske wants to link information to the notion of truth, asserting that “information, unlike meaning, has to be true” (p. 29). Dretske proposes, therefore, limiting the notion of information to Grice’s notion of natural meaning, arguing that “Natural meaning is information” (Dretske, 2008, p. 31).

It is, however, my sense that the production, organization, retrieval, and use of information are most commonly understood to involve the other side of the spectrum, that is, Grice’s non-natural meaning based on conventional signs. I would disagree with Dretske, and say that information is commonly conceived as being closely related to that which provides non-natural meaning.

This distinction follows the trend in which textual analysis previously attempted to follow paths that were closer to the understanding of natural meaning, where more recent approaches embrace the non-natural conception of meaning. Eco explains how there has been a change in textual analysis theory from viewing textual structure as something that should “be analyzed in itself and for the sake of itself” (Eco, 1994, p. 44) to focusing on the “pragmatic aspect of reading” (p. 44). The latter suggests that the function and meaning of a text can be explained only by taking into account the reader of the text. In this tradition, the meaning of a text depends on the interpretive choices made by the reader.

These distinctions play further into the different conceptions of communication and conversation, a clash of different schools of thought that Peter Strawson (1970) called a “Homeric struggle [that] calls for gods and heros” (p. 92). He suggests that in the two sides, we have “on the one side, say, Grice, Austin and the later Wittgenstein; on the other, Chomsky, Frege, and the earlier Wittgenstein” (p. 92).

In Grice’s (1967) most famous piece, he expanded his teleological conception of non-natural meaning and the communication-intention school of thought into the standard understanding of successful meaningful discourse. This understanding is built on the notion that language and meaning is public and shared, which Chapman (2005, p. 90) describes as:

People engage in communication in the expectation of achieving certain outcomes, and in the pursuit of those outcomes they are prepared to maintain, and expect others to maintain, certain strategies.

For this purpose, and to help make explicit those strategies, Grice formulates his Cooperative Principle, which states (Grice, 1967, p. 26):

Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged.

The principle is further expressed in maxims and sub-maxims of conversation, which are organized into four categories (p. 26–27):

- A. Quantity
 1. Make your contribution as informative as is required (for the current purposes of exchange).
 2. Do not make your contribution more informative than is required.

- B. Quality
 1. Do not say what you believe to be false.
 2. Do not say that for which you lack adequate evidence.
- C. Relation
 1. Be relevant.
- D. Manner (Be perspicuous)
 1. Avoid obscurity of expression.
 2. Avoid ambiguity.
 3. Be brief (avoid unnecessary prolixity).
 4. Be orderly.

Grice's (1967) exploration of the nature of conversation, which he ends with the formulation of the Cooperative Principle and the maxims, begins with a twofold starting point.

First, he notes that there is a division between "formalist and informalist groups" (p. 22) of writers on the philosophy of language. The formalist group is concerned with the "imperfection of natural languages" (p. 23) and seeks to erase the "indefiniteness" (p. 23) of expressions and meaning assignment by beginning "to construct an ideal language" (p. 23). Such an ideal language would rest on certain assumptions (p. 23):

These are, that the primary yardstick by which to judge the adequacy of a language is its ability to serve the needs of science, that an expression cannot be guaranteed as fully intelligible unless an explication or analysis of its meaning has been provided, and that every explication or analysis must take the form of a precise definition that is the expression or assertion of a logical equivalence.

Grice, of course, objects to this goal, and finds that language serves many important purposes beyond "those of scientific inquiry" (p. 23). He argues that we can know "perfectly well" (p. 23) what an expression means without a clear analysis or explication of the expression. This places him in the company of the informalist group, which argues that meaning needs to be understood with respect to the discussion of non-natural meaning, with the understanding that language and meaning are social and shared phenomena.

The second starting point is the observation that an expression may say one thing and imply something else, for instance (p. 24):

A asks B how C is getting on in his job, and B replies, *Oh quite well, I think; he likes his colleagues, and he hasn't been to prison yet.*

What B literally says (that C has not been to prison yet) may well be different from what the expression implies or suggests. It may be that A needs to ask B what B actually means by the utterance, or it could be that the meaning of the utterance is given by the context. If one only focuses on what is said, which might be close to the expression truth-conditions, it is possible to miss what is actually meant by the expression. Likewise, the sentence (p. 25): "He is an Englishman; he is, therefore, brave," does not state that his bravery is a consequence of being English, but does imply so.

Grice's Cooperative Principle is based on the notion that communication is a cooperative, rational activity. The Principle and maxims "could be thought of as a quasi-contractual matter" (p. 29) asserting that if one is to communicate successfully, either as a speaker or listener, one should do so within the Cooperative Principle and expect that the maxims are honored. There are many cases where this is not the case, and where the maxims are violated, exploited, flouted, or clash with one another. While this is an important aspect of Grice's work, the focus here is solely on establishing them as the foundation for successful communication.

Successful, meaningful conversation requires that all parties enter the conversation with a shared basic understanding of the ground rules. Such ground rules are often unspoken and implicit, buried in culture, rituals, and habits, but Grice articulates an explicit framework clarifying the basis for meaning and the exchange of meaningful communication. Grice's understanding of meaning and communication provides a solid framework for understanding the production, organization, retrieval, and use of information as creation, generation, and exchange of meaning. Throughout the process, creators, professionals, and users are required to approach information as signs that are generated with the intention of communicating something to somebody—and that are used by somebody for particular purposes in particular contexts. The notion of information quality is tied to this communicative process; the quality of the information may be assessed by its fulfillment of the maxims.

Conversational Information Quality

We can now rethink information quality. When information is viewed as signs in the production and exchange of information; when meaning is viewed as contextual; and when communication is understood as a cooperative rational activity, we have the preliminary outline of a conversational approach to the production, organization, retrieval, and use of information. In such an approach, information quality is contextual: determined publicly and socially in shared forums.

Grice's Cooperative Principle states that when engaging in a conversation, speakers (or senders) must try to contribute meaningful, productive utterances to further the conversation. As a consequence, listeners (or readers) can safely assume that this is what their conversational partners are doing. The quality of the information created and generated within the conversation is bound by Grice's maxims. The maxims acknowledge the messiness of real language, and its inability to capture and represent the world as it actually is, even though this would be the goal of an ideal language. Second, the maxims acknowledge that any utterance may say one thing and imply something else. What the maxims do is to bring attention to these facts and urge both senders and readers to enter the communicative process with this in mind. They are asked to be as precise as possible, while

acknowledging the inherently messy nature of language and communication. Such a framework reveals that information quality is not a matter of whether the information in and by itself is of a certain quality, or a matter of whether any individual person perceives a piece of information to be of high quality. Information quality is contextual and can only be assessed in the context of the information's meaning and use, and of the senders' intentions.

The application of Grice's maxims to the notion of information quality assumes that "describing what we want and evaluating what we retrieve is a lot like a conversation" (Blair, 2003, p. 29). It is further assumed that the conversation will only be successful if Grice's maxims are upheld.

Blair (1992, 2003) looks specifically at the information retrieval process and shows that an awareness of maxims can "provide guidance to the searcher on how to revise the search" (Blair, 2003, p. 29). For instance, if a searcher does not receive enough information (which is a violation of the first maxim of quantity), the searcher can ask for "more of the same kind of information" (p. 29). Likewise, if the searcher receives too much information (a violation of the second maxim of quantity), the searcher can ask for "a more concise summary" (p. 29). If the searcher receives information on the desired topic, but is concerned that the information may be of "questionable veracity (a violation of the first maxim of quality)" (p. 29), the searcher might ask for "any documentation that substantiated [the] claim" (p. 29). We can likewise apply Grice's maxims to explore information quality.

In a recent paper, Hjørland (2011) evaluates the quality of four articles about breast cancer. He suggests that the quality of each of the articles should be assessed against the current research front, and assigns a grade to each of the four articles to reflect their quality.

Hjørland enters into the search conversation with the purpose of finding out about the current controversy over screening which is one of current research fronts in breast cancer research. He therefore assigns a low grade to the article that contains "no errors" but provides "insufficient" information (p. 1896); a higher grade to the article that gives "more information" though it is "not detailed" (p. 1896); and an even higher grade to the article that gives still more "detailed information" though it "fails to provide information about the controversy" (p. 1896). The highest grade goes to the article that is "clearly informed about the controversy" though it misses some "important references related to the controversy" (p. 1896). Hjørland's focus is on whether the articles provide enough information about the controversy over screening programs, and whether bibliographic references are provided. But if the searcher had a different purpose, a different need or a different interest, would the four articles have received different grades?

Suppose that the searcher is, for example, a grade five student working on a school project about different kinds of diseases. This searcher needs some basic information about

breast cancer for his/her project: describing that both men and women can develop breast cancer, that it is the most common form of cancer among women, that approximately 10% of all women in the western world develop breast cancer, etc. It would seem that the first article evaluated by Hjørland might be beneficial for this searcher. This article would in fact meet all of Grice's maxims for the student, while the article to which Hjørland assigns the highest grade would violate many of the maxims; it would contain too much information, it would be ambiguous, it would not be brief, it would perhaps be obscure and too technical, etc. For this particular searcher, it could be argued that the first article (which is factually correct, containing no errors or misinformation) is of higher quality than the later article. The first article gives the searcher what the searcher needs at that stage, and opens the door to continue the research by asking further questions, perhaps with the help of an information professional. We cannot assume to know when and why a searcher stops asking questions and ends the conversation.

Conversely, if the searcher is a leading expert in breast cancer seeking information about the controversy, then little of the information provided in any of the four articles would be of high quality, because they would be too generic to be informative. This would violate many of Grice's maxims and we could say that the articles are of low quality for this kind of searcher.

Instead of focusing on the articles and the information itself, the focus of definition for information quality must be on the conversation. Only by analyzing the conversation and the searcher's social situation can information quality be determined. What is of good quality in one situation might not be of much help in another situation. Only when Grice's maxims are upheld is the conversation successful; only then is information of good quality.

From a Gricean perspective, the quality of information cannot be evaluated independently of the searcher's situation. The quality of information must be understood in concert with the conversation in which the searcher is situated while obtaining information. The quality of the information is not simply a matter of being correct and in line with leading research, but also, and perhaps more important, a matter of being relevant, brief, avoiding ambiguity, offering the right proportion of detail, etc.

Conclusion

Information quality is a foundational notion within information studies. Information studies is fundamentally concerned with providing a user with "what we can call the *best textual means* to his end" (Wilson, 1968, p. 21). That best textual means is often one that is correct, true, authentic, and of high quality. The assessment of information quality, however, enters into a complex web which must take into consideration the sender's intention and knowledge; the intertextual knowledge about the subject matter; the societal, cultural, and contextual facts about the subject matter; and the reader's activities and interests. To ignore any of these

components disregards the true complexity of the issue, and to ignore that complexity runs the risk of presenting solutions and ideas that do not address the actual concerns at stake.

By situating the notion of information quality within a philosophy of information, a better articulation is achieved for what is meant by information. To understand the notion of information quality, we need to understand what is meant by information. The present paper has reviewed the concept of information to develop a semiotic understanding in which information is viewed as a sign to facilitate the exchange and production of meaning. In this sense, meaning and information become closely linked concepts—information quality becomes a product of the degree to which the exchange and production of meaning has been successful. Grice's pragmatic philosophy of language presents a framework through which to gauge such success. Applying his conversational maxims to the assessment of information quality, we discover powerful tools that reveal in detail how information quality is a situational and contextual construct.

People want information of good quality, and to obtain it they often turn to information professionals and professionally maintained information systems and resources. To fulfill this public expectation, information professionals and information study must apply a solid, theoretically sound, and valid notion of information that is grounded in a philosophy of information.

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