Chapter 2
The Nature of Information

Abstract To understand the definition of information I look first at the definition of a related term—knowledge, which is that which is known. Recorded knowledge is knowledge that has been recorded in some tangible way. It is a common misperception that what we do in the information field is provide information. Rather, what we do is attempt to comprehend potential human information requirements, and then subsequently collect artifacts from which the correct informational instructions can be extracted, synthesized, and communicated. We provide context, and we filter it through our own expertise. Information is knowledge perceived. In colloquial usage the term “information” is used to refer to documents themselves, or even to simple data. It is crucial to comprehend the fact that information is a dynamic process, which is a crucial aspect of human existence. Finally, information can be culturally cloaked in the subjective experiences of those who experience its process.

I begin this chapter with a simple question: What is information?
A simple enough question on the face of it, no? But, as it turns out, this is a simple question for which there is no simple answer. The term information has no single, simple definition. Rather, the term has been used in different ways by different authors in our field over the course of the last several decades. Be that as it may, I will attempt to bring us to a consensus about the meaning of information for the purpose of the present discussion. I will begin by looking at the definition of a related term—knowledge—and from that I hope to develop an understanding of information that will serve to underpin the remainder of this book.

2.1 Knowledge, Recorded Knowledge, and Information

Knowledge is (simply enough) that which is known. Think about that for a moment. Just what is it that is known? What is it that you think you know? Everything that is in human experience is known. Some things are known to us individually—our sensory memories, for example. We (at least those of us from the USA) know what it smelled like in Grandmother’s kitchen on Thanksgiving Day. We know what it felt like to have broken Mother’s favorite lamp and have to sit in the corner waiting for Dad to come home. We know how many teabags are left in the cupboard. These
things are inscribed in our memories and have become a part of who we are and how we function. These things that we know inform our every encounter. And our personal knowledge is cumulative and always growing, moment by moment.

There also is public knowledge—the collective knowledge of humankind in general or of some specific group of people (a community) in particular. This kind of common public knowledge is what we often refer to as culture—it is the context of a social contract. The culture is that set of common knowledge that governs how we relate collectively and individually to each other and to our environment. Denizens of both Canada and the United States experience a holiday known as Thanksgiving, and they all engage in a sort of harvest meal, but the occasions are celebrated at different times and have different cultural contexts. Cultural knowledge is context-dependent. “Thanksgiving” is not necessarily “thanksgiving”—without cultural context the meaning is ambiguous. But, each person who has a perceived recollection of “thanksgiving” has knowledge of thanksgiving.

So we can state unequivocally that knowledge is that which is known. In fact, we can refer to a dictionary definition of knowledge from the *Oxford English Dictionary* online; where we find these major components among the complex of definitions:

1. Acknowledgement or recognition.
2. The fact or condition of knowing something.
3. The faculty of understanding or knowing.
4. The fact or state of knowing that something is the case.

For the most part (having left out legal and sexual implications) these clauses point to cognition. As a matter of fact, WordNet™’s definition makes that clear: “Cognition, knowledge, noesis (the psychological result of perception and learning and reasoning.”

Recorded knowledge is knowledge that has been recorded in some tangible way. Facts are written down and disseminated in books. Musical works are set down on paper so they may be subsequently performed. Performances of musical works are set down in sound recordings so that they may be played and listened to over and over. Landscapes are recreated in paintings, which communicate an aesthetic quality of a view. The same landscape may be recreated in a cartographic document—a map—which communicates the geographical details of a place. All of these are examples of knowledge that has been recorded. The artifacts of recorded knowledge are the tangible records with which we work in the information fields.

It is a common perception—I will state here a mis-perception—that what we do in the information field is provide information, as though all we did was to hunt for the right datum to answer a question. “Five,” we might say—well, “five what?” a user might ask of us. For without context no datum is useful at all. So what we do is far more complex than the mere provision of facts. We are more complex as a social structure than any search engine (all due respects to Google™ and Yahoo™, or even Freebase™). In fact, what we do is attempt to comprehend potential human information requirements, and then we collect artifacts from which the correct informational instructions can be extracted, synthesized, and communicated. We provide context, and we filter it through our own expertise. It is no error that librarians are among the first sorts of gatekeepers any society generates once it becomes literate.
The books, manuscripts, scores, recordings, paintings, maps, and so forth that are created to record human knowledge are the artifacts that may be collected, organized, and made available for consultation. And these are not just sources of data—they are real extant artifacts. The leather in the bindings was once on a cow, the gilt edge was once on a rock in the ground, the paper was once a tree or some fabric made from a plant; the techniques used to make these artifacts were and are as important as any data recorded in them. So librarians are secondarily the curators of the artifacts of knowledge, and libraries are the great museums of these artifacts of knowledge. Thus the organization of our artifacts, so we might efficiently extract and synthesize their meaning, is critical. Yet it is important to understand that we do not exactly organize knowledge itself—we cannot organize raw knowledge, which has only the form of thoughts in human minds. Rather, we organize the artifacts of knowledge—some authors refer to these as documents. And these documents, or artifacts, subsequently, might be consulted by people who are seeking knowledge.

And that brings us to information. Information is knowledge perceived. That is, what is contained in documents is potential information—it is recorded knowledge that may be consulted for whatever reason. But when that knowledge is consulted and is perceived by the human brain, information is the result. Buckland (1988, p. 30), usefully, has written of this as becoming informed:

Becoming informed is the term we use to denote the process whereby people’s personal knowledge changes in response to the messages they receive. (One could have used the term “information” to denote this process, but it would be ambiguous since the term “information” is more commonly used to denote the data, signals, or messages, i.e., the stuff as well as the process.)

There are several implications of this important concept. First, information is a process and not a thing. Information therefore, is dynamic and not static. Information is what happens to a person when knowledge is perceived, because that new perception alters the person’s previously existing knowledge-base. The process of becoming informed can be complex—Cole (1994, p. 475) has suggested a multipart process where concepts enter a “sense data registry” for later use in the modification of a knowledge structure at its highest fundamental level. Information changes people. Which means that information can be very important.

But even Buckland (1988, p. 115) notes the confusion about the term. At least in colloquial usage (and much too often in the library and information press) the term “information” is used to refer to the documents themselves, or to what Buckland has called “the stuff.” We must acknowledge this confusion about the most important operative word in our repertoire—for many people, maybe even for most people, information means data and documents. (Even the newest text, Bawden and Robinson (2013), admits to the confusion, using a table to illustrate 11 common differing definitions.) Buckland avoids the terminological confusion by using the term “becoming informed” to denote the process, and leaving the term “information” to its colloquial usage. In this text I will not give in so easily. Acknowledging that there is confusion does not mean we necessarily have to abandon our understanding of information as a dynamic process.
In fact, despite the confusion that arises from colloquial usage and that can be observed in any number of the journals of our field, we can find some affirmation of our assertion that information is process by returning to the dictionary (Oxford English Dictionary online):

1. The imparting of knowledge in general …. 2a. Knowledge communicated concerning some particular fact, subject or event; that of which one is apprised or told, intelligence, news …. 3a. The action or fact of imparting the knowledge of a fact or occurrence; communication of news; notification….

Interestingly, these definitions all embrace motion or action (once again we are forgoing peculiar associations with sex or the law)—imparting, communication, appraisal, telling, notification—all ways of describing the process of becoming informed. WordNet™ embraces the colloquial multiplicity of meanings but also embraces process:

- a message received and understood;
- knowledge acquired through study or experience or instruction; …
- a collection of facts from which conclusions may be drawn; and,
- a numerical measure of the uncertainty of an outcome.

Here we see reflected the duality of information as thing—e.g., message, knowledge, facts—but also the processes—received, understood, acquired.

It is crucial, then, to comprehend the fact that information is a dynamic process that has the potential to change people. Information is no static bunch of documents—rather it is a crucial aspect of human existence. Buckland refers to Fairthorne when he asserts that “information is not stuff but a process.” Fairthorne (1961) wrote:

Information is an attribute of the receiver’s knowledge and interpretation of the signal, not of the sender’s, nor some external omniscient observer’s nor of the signal itself.

Fairthorne gives us the other side of our definition that completes its explanation. We see that not only is information the process of becoming informed, but also that information is neither the data nor the vehicle, neither the fact nor the document. Information is a process that happens inside the mind of the one who becomes informed. Information changes a person’s knowledge-base, and that in turn affects the way the person relates in community and in the environment. Information changes lives and that makes it a very powerful commodity.

### 2.2 Scholarship About Information

If you study information in any of its cognate disciplines (like physics, mathematics, social science, communications, journalism, and so on) you will discover a common understanding of information as a pipeline. This is what Day (2000) has called the “conduit metaphor.” It comes from an early mathematical theory of communication by Shannon and Weaver that suggested information was like a signal
traveling across a wire. If it got to the other end safely it could be received, and if anything went wrong in the process that was called “noise.” Noise was thought to be the main problem that prevented the process of information from coming to fruition in any case. Day is a critical theorist, which is a kind of historian—his point is that, not only is this metaphor incomplete, it is misleading, and its power has kept many in the field from exploring more promising approaches.

Imagine approaching your ATM and putting in your card and then you hear a loud noise and poof your card is gone. What will you do? The screen offers you no options. Your card is gone. There is no “noise in the channel” here, instead the system has crashed and taken you with it. This I think is Day’s point—we need to get past the blinders of this metaphor so we can truly understand the power of information as an existential phenomenon. When I tell you to read Buckland, I have informed you. When I step on a tack the pain has informed by body of an intrusion. When you water your hibiscus and it stands up straight you have informed the plant of its nutrition. And on and on I could go.

In fact, Michel Menou (1995, p. 482) wrote a series of articles about a potential theory of information. His most important contribution (arguably) was his insistence on three elements: semantics, syntax, and paradigm. In other words, context is critical for the comprehension of information—senders and receivers alike (to refer to the conduit metaphor) need meaning (semantics), rules (syntax), and context (paradigm) to make “sense” of information tasks. Menou, therefore, called us to attend to the problem of sense-making as information professionals.

One attempt at a comprehensive review of information was by Bates (2006). She attempted to draw together several theories of information from different disciplines, including physics and biology. She came to the conclusion that information could be described as (p. 1044): “the pattern of organization of matter and energy.” She then draws on disparate theories to suggest (not unlike Buckland) that there are different kinds of information—some naturally encoded, some genetically embedded, and some external to the body. Of course, her point of view is controversial. Barely a year later in the same journal Birger Hjørland, a very important Danish philosopher of information science and knowledge organization, took issue with nearly all of Bates’ points. Hjørland (2007) said that we have to consider whether information is situational or objective. Although his text was more complex than this, he essentially suggested that information is situational, emergent, and evolutionary—in other words, vague until interpreted. Notice that his point of view accords nicely with Menou’s notion of sense-making and with Buckland’s notion of the process of information. This is a semiotic point of view—semiotics is the science of signs, meaning that all perception is constantly interpretatively mutable—but it has some appeal as an explanation of the difficulties we have as professionals whose job it is to provide information. And it speaks exactly to why we have to be attentive to more than just finding data as answers to questions, because information needs are constantly evolving.

In a fascinating study conducted in 2004–2005 an Israeli information scientist named Chaim Zins conducted a Delphi study of information scientists worldwide to see whether he could generate a common definition of “information.” Delphi
method is often used to consult a set of scholars about generating a research agenda for the future. This time it revealed all of the disparity in the discipline—the 57 scholars came up with 57 different definitions, and refused to budge or to agree even a little bit with each others’ points of view. The 57 scholars drew 28 different maps of the discipline. In the end all that could be generated as consensus from the study was a list of essential components: data, information, knowledge (Zins 2007). These, he asserts, are the fundamental building blocks of the discipline. The problem is, as Zins admits (p. 479) the field supports diversified meanings for all three.

Which brings us back to Hjørland who with Capurro (2003) acknowledged that there are two main schools of thought, information as an object (a thing) and as a sign (a subjective concept). But they also concluded (interestingly enough, 3 years before Hjørland’s public dispute with Bates) that interdisciplinary understanding is important. In fact, in the next chapter we will see how Bates (among others) has called for an interdisciplinary comprehension of concepts of information, and how we alone in the field of information are well prepared to deal with this interdisciplinary schizophrenia.

More recently the concept of information has been the subject of books in the general marketplace. An early and concise example is Floridi (2010), which is a survey of the meaning of information within and across several disciplines—mathematics, semantics, physics, biology, and economics—together with an ethical summary. Floridi places his text within the context of information revolution and information society—in essence a social context—and suggests a common life-cycle of information that includes a sequence of phases (p. 4): occurrence, transmission, processing and management, and usage. Interestingly this sequence moves across the boundaries we’ve already encountered. That is, here information moves from sign to object, from sense-making process to thing. At the time of publication of this book Floridi holds a chair in the philosophy of information at the University of Hertfordshire—a philosopher and author about ethics and thus a scholar able to take a broad overview of information. A thesis of his book is that human society is experiencing a revolution in which a reassessment of humanity’s role in the universe is shifting from a perception of material reality to one of information. He characterizes this with everyday examples—a shift, say, from material assets to virtual assets, as from holding a room full of LP music recordings to having, instead, digital access to musical sound. The difference is profound and has profound consequences as society shifts from object to process—the reverse of the sequence he suggests—in its comprehension of information. In 2011 James Gleick, a historian, produced the very impressive (and very long) history of information, moving deftly from a story of talking drums to a conclusion that society might face information exhaustion. Gleick does not so much define information as trace a history of the idea of information as a cultural and social phenomenon. His account of the story of Claude Shannon and the evolution of the conduit theory of information is fascinating reading, and it helps us understand perhaps the role of that theory in our own information field. In Gleick’s text, what he calls “the information” is not a scientific phenomenon (although some of its iterations are so presented) so much as a social one, neither process nor thing, then, but rather a large part of human experience.
Finally (at least for now), Mai (2013) reviews much of the material reviewed here and more (and in more detail) as an approach to discussing the concept of information quality. Like those cited above, he settles on two kinds of information, one kind that is quantifiably measurable and another kind that is psychological (p. 676). He concludes that the most useful approach is to perceive information as a kind of sign (p. 686) “to facilitate the exchange and production of meaning,” process and thing intertwined. Bawden and Robinson (2014) survey the concept and usage of information in five domains, arriving at the description of what they call a “binary divide” (p. 131) between objective and subjective, comparable to (or perhaps parallel with) Mai’s notion that information can be measurable or psychological. And Furner (2014) reviews the multiple ontological commitments of information theorists, all outside of our information field, suggesting in the end that it is useful and appropriate, because of our own ontological pluralism, that we should have no single definition.

2.3 Many Ways of Information

The word “information” is used in many ways both colloquially and in the information discipline. In this chapter I have asserted that information is knowledge perceived. Knowledge—things that are known, both communally (as in the knowledge base that defines a culture) and individually—can be recorded in some tangible way. The records of knowledge can be organized to provide access both to the records themselves (as in a library) and to the knowledge they contain (as in information retrieval systems). Information is the process of becoming informed—neither the data nor the vehicle, neither the fact nor the document.

And as we have seen from this review, information can be culturally cloaked in the subjective experiences of those who experience its process. It is this cloak of cultural context that gives information its synergistic promise.

References


Cultural Synergy in Information Institutions
Smiraglia, R.
2014, VI, 82 p. 15 illus., 12 illus. in color., Hardcover