Philosophy and the information sciences

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ABSTRACT

Philosophy and the information sciences intersect in various ways. Philosophical
approaches to the study of information and information-related phenomena focus on
metaphysical, epistemological, and ethical questions; philosophical approaches to the
study of the information sciences focus on methodological issues. Metaphilosophical
questions may also be asked about philosophy of information and about philosophy of the
information sciences.

1 INTRODUCTION
There are several scholarly activities or practices that coalesce at the intersection of, on the one hand, philosophy, and on the other, the information sciences. The aim of this entry is to distinguish among some of these practices, and to assess their significance, both for philosophy and for the information sciences. In particular, a distinction is drawn between philosophical questions asked in the information sciences and philosophical questions asked about the information sciences, and the goals and subject matter of philosophy of information and philosophy of the information sciences are described. This distinction is made in the spirit of conceptual clarity, rather than to reflect a division that is rigorously respected in actual scholarly practice: people interested in philosophy are likely to be interested in questions of all of these kinds.

To some who work in the information sciences, the questions that are posed in philosophy may seem like “meta-questions,” in the vague sense that they are after, later, beside, beyond, or above other questions to which answers are required more immediately, directly, or pressingly. Since categories of meta-questions are commonly identified as forming core components of the contents of fields at the intersection of philosophy and the information sciences, it is worth taking some care to clarify several different conceptions of the qualities that distinguish meta-questions from their non-meta counterparts.

1.1 PHILOSOPHY OF INFORMATION AS A META-FIELD
Encountering the information sciences for the first time, we might wonder what they are all about. We might want to ask, for example, What is this thing they call “information”? In what way does it exist? What kind of thing is it? Of what fundamental category of things is it an instance? What is its essence? What are its properties? What are the necessary and the sufficient conditions some thing must satisfy for it to be counted as information? Questions about the mode of existence and the basic nature of different kinds of things are questions that are asked in the branch of philosophy known as *metaphysics*, i.e., philosophy of being. They might be treated as meta-questions simply because they are foundational questions about the fundamental nature of the things in which we are interested. The simple form of questions of this sort belies the difficulty of providing answers that survive all challenges.

The questions just listed are questions about a phenomenon—information—that is a core component of the subject matter of the information sciences, and they are questions that are commonly addressed both in introductory texts (e.g., Case 2007) and in more advanced treatises (e.g., Bates 2006) in the information sciences. Their philosophical nature (of which more will be said below) and their focus on the phenomenon of information are individually necessary and jointly sufficient conditions of their also being considered part of a branch of philosophy known as *philosophy of information*, and they are questions that are commonly addressed both in introductory texts (e.g., Floridi 2003) and in more advanced treatises (e.g., Floridi 2005) in that field, too. Philosophy of information is discussed in Section 4, below.
1.2 META-QUESTIONS ABOUT THE INFORMATION SCIENCES

We may distinguish questions that are raised by or in a discipline or field of inquiry, or in a group of fields like the information sciences, from questions that are about that field or group of fields. Questions of the second kind might include questions about the subject matter of the field, its scope, its purposes and/or goals, its methods, its relationships to other fields and to other activities, and its usefulness, worth, or value. These are meta-questions about the field as a field: i.e., questions that are raised by studies of the field, rather than by studies in the field.

Sometimes it is considered that it is worth keeping the second-order questions that relate to a given field separate from their first-order cousins, and treating the second-order questions collectively as a discrete “meta-field.” Sometimes such meta-questions are identified as being philosophical questions simply in virtue of their second-order status, and the aggregate of such questions is what is construed as the philosophy of field x—even though it might be unclear as to what is strictly philosophical about any given meta-question. More commonly, however, the history, sociology, and politics of any given field x are identified as meta-fields that are distinguishable from the philosophy of field x. Meta-questions about the who, what, where, when, and why of the information sciences are the kinds of questions that are asked by sociologists, historians, and political theorists: What is the subject matter of the information sciences as they have been practiced at different points in history, and in different social contexts? What are the characteristics of the social groups whose members work on the information sciences? What motivations
have people had for devoting time and other resources to the study of information and related phenomena? Why ought people to be interested in information?

*Philosophy of the information sciences* may then be distinguished from the history, sociology, and politics of the information sciences as the meta-field in which distinctively philosophical questions are posed (and philosophical answers attempted) about the information sciences. We might ask, for example, What is the nature of the information sciences? In what essential respects do they differ from other areas of inquiry? Questions of this kind are different from questions of the kind asked in philosophy of information (as defined above), in the sense that they do not arise *in* the information sciences and are not answerable by doing information science. Indeed, philosophy of the information sciences—like, for instance, philosophy of the biological sciences—may readily be construed as a branch of philosophy of science. Philosophy of the information sciences is discussed in Section 5, below.

1.3 PHILOSOPHY OF PHILOSOPHY AS A META-FIELD

There is another, narrower sense in which a field of inquiry may be identified as a meta-field. This is the sense in which philosophy of philosophy (also known as *metaphilosophy*) is considered a meta-field. One important characteristic of metaphilosophy is its reflexivity. A *reflexive* meta-field is one that comprises the *x*-like study of *x*—for example, the philosophical study of philosophy (see, e.g., Williamson 2007); or the information-scientific study of the information sciences (see, e.g., White &
McCain 1998). Indeed, it is possible to ask philosophical questions about philosophy of information and about philosophy of the information sciences: about, for instance, how they ought to be done. Again, questions of this kind are different from questions of the kind mentioned in the previous paragraph, in the sense that they are questions about philosophy of those particular kinds, rather than questions that arise in philosophy of those kinds or that are answerable by doing philosophy of those kinds. The possibility of a productive metaphilosophy of information and of the information sciences is briefly revisited in Section 6, below.

1.4 THE INFORMATION SCIENCES AS META-FIELDS

Sometimes the information sciences themselves are taken to form a group of fields of inquiry that are each, in a unique and significant way, concerned to answer meta-questions about other fields (Bates 1999). In one important sense, much of the subject matter of library and information science, for instance, consists of other fields of inquiry: the objects of inquiry are those other fields. Studies of the structural relationships among and within different fields (for example, studies of the frequency with which, and the ways in which, authors in field $x$ cite authors in field $y$), of the information needs and uses of people working in and between different fields, of the processes by which information is produced, organized, retrieved, communicated, and applied in different fields—these can all be considered as exemplifying a meta-field, in the sense that the subject matter of that field is made up of other fields. Other fields of inquiry that are regularly identified on this basis as meta-fields are education and, indeed, philosophy of
science. Introductory characterizations of the information sciences and of philosophy are respectively provided in Sections 2 and 3, below.

1.5 INFORMATION META-STUDIES AS A META-FIELD

Sometimes it is enough that a particular study involves or requires comparative evaluations of alternative theories, models, or conceptual frameworks, or simply that it consists of an overview or summary of multiple sets of previously published data, findings, or conclusions, for it to be categorized as a meta-study. Examples certainly exist of named meta-fields that are devoted to classifying and assessing theoretical frameworks: recently emerging subfields of philosophy include metaethics, metaontology, and metametaphysics. By analogy, we might imagine a field called “information meta-studies” that comprises comparative evaluations of alternative theories in the information sciences. Such work is not considered further in this entry.

1.6 PERSONAL/PROFESSIONAL PHILOSOPHIES OF INFORMATION WORK

Similarly, one sense of “philosophy” that will not be covered further in this entry is the one that people mean when they talk about their (or their institution’s) personal or professional “philosophy” of information work, scholarship, or research. It is in this sense that people sometimes talk about having a philosophy, which is different from the sense in which philosophers do philosophy. Talk about the philosophy that one has, in this sense, is typically equivalent to a statement of one’s long-term or fundamental goals or
mission, or a statement of one’s basic or most strongly-held values. Having a knowledge of professional ethics is not a necessary prerequisite for making statements of goals or values. Nevertheless, study of professional ethics can provide suggestions of values to hold that are in line with others’, and can provide knowledge of ethical principles that can aid choice among values. Information ethics is commonly construed as a branch of philosophy of information, but mere statements of values (which may or may not result from the study of information ethics) are not usually conceived as contributions to philosophy—at least, not in the strict sense of “philosophy” used by most philosophers.

2 THE INFORMATION SCIENCES

Before embarking on any further examination of the intersections between them, it would be useful to be able to draw on characterizations both of philosophy and of the information sciences—ideally by considering suggestions of the necessary and sufficient conditions which must be satisfied before identifying any given work as a contribution to either philosophy or the information sciences. Some would say that to define either field would itself be to engage in philosophy; so maybe if we briefly indulge in an attempt to define the information sciences, it will become partially clear, through example, what philosophy of the information sciences is.

The goals of people engaged in any field of inquiry typically include not just fame, fortune, and happiness, but also the production of knowledge about (or, perhaps, the shedding of light on, or the making of sense of) a particular part or aspect of the world,
through the construction of theories and explanations and the interpretation of meanings and understandings, and the application of that knowledge in a way that changes the world for the better in some respect. What is the particular part or aspect of the world with which the information sciences, especially, are concerned? In other words, what is the subject matter of the information sciences? What are they about?

The simplest answer, of course, would be that the information sciences are about information. Perhaps this answer could be extended relatively uncontroversially to include, as the subject matter of the information sciences, certain phenomena that are thought to be closely related to information, and the ways in which people interact with information and with information-related phenomena. Even taking this short step, however, would likely dismay some who would prefer to treat an emphasis on people’s interactions with information as merely one example of a range of approaches that may possibly be taken to the study of information, each of which is associated with a number of presuppositions about the nature of information and its role in the world. In any case, such a barely extended answer would require augmentation in several respects before it could provide real insight into the nature of the information sciences. Helpful additions would include: a definition of information; enumeration and description of information-related phenomena, and indication of the respects in which and strengths with which they are related; and enumeration and description of ways in which people interact with information and with information-related phenomena.

2.1 DEFINITIONS OF INFORMATION
Different conceptions of information have attracted consensus to different degrees in different communities. The multiplicity of current conceptions partly reflects the lack of agreement among communities on a prioritization of the desiderata that a conception should satisfy. In particular, the outlook for those who would hold out for a “one size fits all,” transdisciplinary definition of information is not promising. It is possible, nevertheless, to identify a number of general categories or families of conceptions of information that have proven useful in relatively broad ranges of contexts.

1. A *semiotic* family. In conceptions in this group, distinctions are typically made on the one hand between (a) real-world states, facts, or situations, (b) mental representations of those situations, and (c) linguistic expressions of those representations, and on the other between (i) tokens, and (ii) types, of situations, representations, and expressions—forming a model (of the relationships between reality, thought, and language) of the kind roughly depicted in Fig. 1 (Furner 2004a). Each distinct conception of information in this family equates information with the content of a different cell in the model. For many, the crucial decision will be to choose between a conception of information-as-signal (Buckland’s “information-as-thing”), and one of information-as-message (Buckland’s “information-as-knowledge”), but conceptions of information as the stuff of which real-world states are actually composed are not rare (Buckland 1991; Floridi 2004; Bates 2005). *Objectivist* versions of the popular view of information-as-message assert that information resources (texts, sentences, words, characters, bits) “contain” information, that information resources “have” meanings, that “the” meaning of an information
resource is discoverable by all, and that whether a given information resource has a given meaning is an objective matter. *Subjectivist* versions recognize, in contrast, that information resources do not “have” meanings, but that different meanings are assigned to the same resource by different people at different times, and that “the” conventional meaning of a given resource is a matter of intersubjective consensus (Hjørland 1992).

2. A *socio-cognitive* family. In conceptions in this group, the emphasis is on action and process, and especially on processes by which people become informed or inform others. Information is conceived either as the act that causes a change in a person’s mental state or internal “knowledge structure,” or as the event in which such change takes place (Brookes 1980; Belkin 1990). Different theorists have different views about the respective strengths of different kinds of influence on the effects of the informing act. Adherents to a *physical*, systems-oriented paradigm that is based on a literal reading of Shannon’s mathematical theory of communication (Shannon 1948) ascribe no role to the intentions of the individual person, whereas proponents of the *cognitive*, user-oriented viewpoint allow that the nature of the change wrought on an individual’s mental model or image of the world by a given informative act depends at least partly on the prior state of that individual model. The main theme of the *sociological*, community-oriented paradigm is that individuals’ images of the world are shaped at least partly by those individuals’ understandings of others’ views, while the *cultural*, discourse-oriented paradigm derives from a recognition that the world itself is socially constructed in a strong sense, i.e., as a direct result of people talking about it (Talja et al. 2005).
3. An *epistemic* family. Conceptions of information in this group are developed with the aim of providing an account of the properties that an information resource must have if the beliefs that are generated upon interpreting the content of that resource may be said to be justified. These are conceptions of information-as-*evidence* (see also Furner 2004b). On the relatively few occasions on which information is taken seriously in the philosophical literature as a category to be distinguished carefully from knowledge, it is typical for “information” to be equated roughly with “evidence,” and for the primary question about information to be understood as the question about what the evidence must be like to justify a given belief-that-$p$, and thus to qualify that belief (if it is one that is true) as knowledge. Theories of *semantic information* (also known as informational semantics) have been developed that propose probabilistic methods of evaluating the informativeness of evidence as the degree to which it provides warrant or grounds for believing-that-$p$. Such methods typically involve calculating the unexpectedness of the observed evidence given the probabilities of occurrence of all the possible alternatives. In this sense, they derive from Shannon’s “information theory” (i.e., the mathematical theory of communication), and form the core of the branch of philosophy of knowledge known as *information-theoretic epistemology* (Shannon 1948; Dretske 1981). The project that Floridi calls “Philosophy of Information” (PI) is a major contribution to this subfield (Floridi 2002a).

2.2 INFORMATION-RELATED PHENOMENA
Different kinds of phenomena may be considered to be “related” to information (howsoever information is defined) in different ways. Some phenomena may be seen to be related in virtue of their being the same kinds of things as information. Conceptions of information-as-message, for example, tend to be held at the same time as conceptions of knowledge-as-message, in which case knowledge and information are said to be related in the sense of their being identical. On the other hand, in such conceptions, information is distinguishable from data on the basis that information is the content or meaning of data: here, information and data are related, not in virtue of a conceptual identity, but in virtue of one (information) being a kind of property of the other (data). Similarly, authors, indexers, and searchers are related to information in respect of their being agents that are involved in the creation, representation, and seeking of information resources; libraries, archives, and museums are related to information in respect of their being institutions that are involved in the preservation and provision of access to collections of information resources; aboutness and relevance are related to information in respect of their being relations that structure networks of information resources; and so on.

2.3 KINDS OF HUMAN–INFORMATION INTERACTION

Lists of information-related phenomena are necessarily endless, and of limited utility: what is potentially more interesting from a philosophical perspective is the structure of fundamental categories of phenomena (e.g., objects, properties, relations, agents) developed by the listmaker. Similarly, no list of the kinds of things that we might imagine people wanting to do to, with, or through information could be exhaustive, no matter
what definition of information is accepted. But taxonomists of information-related actions or events commonly adopt a framework that is loosely based on the notion of an information life-cycle, whereby information resources (if not the meanings attributed to those resources) are assumed to have a concrete existence in space-time, and to be subject to change and to processes of cause and effect. Within such a framework, distinctions are often made between the following categories of actions or events: production, creation, and generation; reproduction; preservation and storage; representation, description, cataloging, registration, and documentation; organization, arrangement, and classification; transfer, communication, retrieval, and provision of access; search, discovery, and seeking; evaluation and appraisal; use and application; and destruction.

2.4 THE SCOPE OF THE INFORMATION SCIENCES

The aggregate scope of the fields collectively labeled “the information sciences” or “information studies” is very broad. Any precise delineation of that scope will depend partly on the sense in which “information” is understood. Different authors, working with different conceptions of information, continue to define the scope of the information sciences in very different ways. There nonetheless appears to be a reasonably stable consensus about the identity of those areas of concern that collectively form a central core, in contrast to other areas that are typically recognized as more peripheral. One formulation of the goals of projects associated with this core might run as follows:
1. understanding the nature of information, of information-related phenomena, and of human–information interaction;

2. understanding the identities, purposes, motivations, intentions, needs, desires, and actions of people engaged in interaction with information;

3. designing and building systems, services, and structures that help people to meet their goals when interacting with information; and

4. developing and administering policies and institutions that enable and/or constrain people’s interactions with information.

Within this framework, it is possible also to distinguish between a conception of the information sciences (or of some of its components) as essentially descriptive, devoted to the construction of theories that explain how information-related events actually do occur in the real world and why real people actually do act and think in the ways that they do, and a conception of the field as essentially prescriptive or normative, devoted to the specification of the ways in which things should happen and the ways in which people should act.

In pursuing projects of these kinds, information scientists draw on theories and practices developed in many overlapping fields of inquiry, not least of which is philosophy and its various branches. Understandings of the nature of information and of information-related phenomena are constructed in the light of developments in metaphysics, epistemology, ethics, and logic, as well as in the humanistic fields of art theory, literary theory, semiotics, linguistics, and history. Understandings of the activities of information users
build on the behavioral and cognitive models developed in the life sciences: biology, psychology, cognitive science. Information systems design is informed by work done in engineering, technology, and design fields, including computer science; while information policy development and institutional management rely on insights generated by the social sciences and related applied fields: sociology, anthropology, political science, economics, public policy, business administration, and law. Notwithstanding one’s readiness to accept the particular formulation of the core of the information sciences presented above, the extent to which the content of the information sciences overlaps with that of “other” fields should be clear.

3 PHILOSOPHY

The question “What is philosophy?” is a meta-question (both in sense 1 and in sense 3 as defined in Section 2, above) about philosophy. It is one that arises in philosophy of philosophy (a.k.a. metaphilosophy). Answers of many different kinds have been proposed since the original identification of philosophy as a discrete field in the ancient era. These proposals may be categorized on the basis of the kinds of criteria on which each proposal distinguishes philosophy from other fields. For example, one proposal might be to distinguish philosophy from other fields by pointing to differences between the kinds of *phenomena* that form the subject matter of philosophy and those of other fields; another might point to differences in the kinds of *questions* that are asked in philosophy and in the other fields; another might point to differences in the kinds of *methods* that are used to answer the questions that arise in philosophy and in the other fields; while yet another
might point to differences in the kinds of goals or purposes that motivate people to engage in philosophy and in the other fields.

Different kinds of proposals have attracted varying levels of consensus at different times and in different places. It is important, yet difficult, to avoid misleading overgeneralization when characterizing the state of philosophy, even when the scope of the exercise is deliberately restricted to whatever is called “philosophy” by those who claim to practice it in a particular culture, such as the academy in the “western” world of the early twenty-first century. A simple caricature of the nature of philosophy at this point in its history might emphasize its concern with the most basic, fundamental, or foundational of phenomena (such as action, beauty, belief, being, causation, consciousness, evidence, existence, experience, goodness, identity, intentionality, justice, knowledge, meaning, necessity, rationality, reality, representation, responsibility, rightness, thought, time, truth, value, and virtue); its concern to ask the most basic of questions (such as “What is x?,” “How do we know that p?,” and “Why ought we do a?”); its promotion of, and reliance upon, the most basic of methods in answering such questions (such as analysis of the very concepts that are used in expressing the questions, analysis of the logical form of arguments, and analysis of the mental processes by which we interpret our worlds); and its pursuit of the most basic of goals (such as truth, happiness, justice, peace, authenticity, power, and an understanding of the meaning of life). Such a caricature would fail to represent several significant respects in which metaphilosophy inspires ongoing debate:
1. the ways in which contemporary “western” philosophy is similar to and different from philosophy as practiced in “other” contemporary cultures, and from philosophy as practiced in earlier eras;

2. the ways in which philosophy as traditionally practiced is infected with systemic biases deriving from its domination by old, white, middle-class, heterosexual males;

3. the ways in which twentieth-century “analytic” philosophy (also known, somewhat misleadingly, as Anglophone or Anglo-American philosophy) is similar to and different from twentieth-century “continental” philosophy (also known, again somewhat misleadingly, as European philosophy);

4. the ways in which several historically-specific “turns” or transdisciplinary shifts in emphasis (such as “the cognitive turn,” “the linguistic turn,” and “the cultural turn”) have affected different groups’ understanding of the nature of inquiry in general and the proper purpose of philosophy in particular;

5. the extent to which philosophy is conceived as having (a) a normative or prescriptive rather than merely descriptive purpose, on account of which conclusions are drawn about how the world ought to be, as well as or instead of about how the world is, and (b) an “applied” as well as a “pure” function, in which real-world decision-making is informed by insights derived from philosophical analysis;

6. the ways in which different communities of philosophical practice emphasize different criteria for evaluating the results of philosophical analysis: e.g., truth, correspondence with external reality, internal coherence, power, utility for
producing testable theory, utility for controlling future events, richness of
coverage, simplicity, elegance;

7. the ways in which the methods and goals of philosophy are similar to and
different from those of the empirical or natural sciences, and the ways in which,
historically, the pendulum of dominant opinion has swung between rationalism
(very roughly, the view that a priori knowledge is possible) and empiricism
(which denies the possibility of any kind of justification for knowledge other than
experience);

8. and the ways in which philosophy may be divided into discrete branches or
subfields.

At the most general level, it has become conventional to distinguish between, on the one
hand, a small number of long-standing subfields such as metaphysics (which focuses on
questions to do with being and existence), epistemology (knowledge and belief), ethics
(goodness), aesthetics (beauty), phenomenology (experience), and philosophical logic
(truth), and on the other, a much larger number of subfields with (in most cases) shorter
histories, whose names typically take the form “philosophy of x.” There are branches of
philosophy that are concerned with the fundamental ways in which human beings relate
to their selves, to one another, and to their environments: philosophy of mind, philosophy
of language, philosophy of action. And there are branches of philosophy that are
concerned with particular intellectual, creative, spiritual, social, and physical pursuits:
philosophy of education, philosophy of art, philosophy of technology, philosophy of
religion, political philosophy, philosophy of sport. There are branches of philosophy that
are concerned with particular disciplines, fields, professions, and practices: philosophy of
science (including philosophy of physics, of mathematics, of psychology, of the social
sciences, of the information sciences, etc.), philosophy of history, philosophy of law. And
there are branches of philosophy concerned with particular phenomena: philosophy of
time, philosophy of race, philosophy of information.

These branches of philosophy are themselves social constructs. Their boundaries are
to entirely arbitrary and far from definite. Insights derived from any one are regularly
applied in (or, just as regularly, contradicted by) work done in another. Both philosophy
of information and philosophy of the information sciences, for instance, are informed by
many findings, claims, and proposals originating in other of the branches of philosophy
listed above. That the findings, claims, and proposals that originate in philosophy of
information and philosophy of the information sciences likewise inform the work done in
those other branches is a claim that warrants further investigation (see Section 7, below).

4 PHILOSOPHY OF INFORMATION

Some of the questions asked in the information sciences are philosophical questions, and
it is in this sense that philosophy and the information sciences overlap.

4.1 METAPHYSICS
Some of these philosophical questions are *metaphysical* questions, in that they are motivated by a desire to understand the essential nature of information-related phenomena, and the roles or positions of those phenomena within the totality of phenomena. For instance, we may ask: What is information? What are documents, data, records, metadata? What are works, texts, editions, versions, copies? What are representations, reproductions, images? What are information sources, information structures? What is relevance, aboutness, authorship? What are subjects? What are authors, indexers, searchers? What is information production, reproduction, representation, preservation, storage, organization, access, seeking, transfer, retrieval, evaluation, use, destruction? The basic motivation for attending to questions of these kinds is the prediction that our answers—developed by carrying out careful analysis of the concepts or categories that we construct and use to think about real-world substances and properties—will help us to clarify our thoughts, strengthen our arguments, and improve the quality of the decisions and actions taken on the basis of the conclusions of those arguments.

Some of these metaphysical questions can be construed as *ontological* questions. Ontology is the branch of metaphysics that is concerned to identify and understand the fundamental categories or kinds of things that exist in the world. For any of the phenomena listed above, we may ask, What kind of thing is it? An abstract thing or a concrete thing? A universal or a particular? A substance or a property? An object or an event? A set or an element? One of the tasks of ontology is to identify and characterize these different categories (see, e.g., Lowe 2006). It may sometimes be helpful to
distinguish between “pure” ontology in that sense, and the “applied” ontology that is being done when information-related phenomena are being fitted into any predefined categorical structure (B. Smith 2003). (Another sense of applied ontology is that which is used to encompass work on modeling the kinds of entities and relationships about which information is to be stored in databases; see, e.g., Le Boeuf 2005.) In virtue of its focus on human-created artifacts that are the objects of human interpretation, ontology of information is closely related both to ontology of art (including ontology of literature) and to projects with metaphysical ramifications in philosophy of language and representation and in semiotics (see, e.g., Thomasson 2003; Mai 2001).

4.2 EPISTEMOLOGY

Some of the philosophical questions that are asked in the information sciences are epistemological questions, in that they are motivated by a desire to understand the ways in which information and other information-related phenomena are involved in the processes by which belief can become knowledge.

In the information sciences, just as there is no standard conception of information, there is no standard conception of knowledge. The two main rival views are those of knowledge as true information (or information about the facts, i.e., information about the way the world really is), and knowledge as internalized information (i.e., the content of individuals’ mental images or representations of the world). These both differ from the theory of knowledge that is traditionally provided by epistemology, which is that
knowledge is justified true belief. In other words, for any one of our beliefs to count as knowledge, it must be both (a) one that is true, and (b) one for which justification can be provided. Different forms of the traditional theory give different accounts of what it means for a belief to be evaluated as true, how the truth-value of a belief may be determined, how justifications of different kinds may be supplied, what degree of certainty is required of a justification, and so on.

For the information scientist, there is a dual motivation for studying and contributing to epistemology. In the first place, we may learn about potentially productive methods of generating information-scientific knowledge (see Section 5, below). In the second place, if we accept the idea that there is some sort of conceptual relationship between information and knowledge, we are only a short step away from accepting that what we say about the nature of knowledge and about how it is acquired will influence what we say both about the nature of information and about how we collect, organize, and provide access to the content of information sources (i.e., recorded knowledge). An understanding of epistemology thus helps us to determine what our information structures, systems, services, policies, and institutions ought to be like, and what they ought to do, if the processes by which we interact with information are to result in the satisfaction of our “epistemic objectives”—e.g., the rapid, cheap, and easy acquisition of all and only those beliefs that are justified, true, and relevant (Fallis 2006).

Historically, there have been two main points of intersection between epistemology and the information sciences. Firstly, and as already mentioned above in Section 2.1, some
accounts of justification rely on a particular conception of information as evidence.

Secondly, library scientists were among the first to express and address the idea that the processes by which knowledge is acquired are significantly social in several respects. Margaret Egan and Jesse Shera were the first authors to use the term “social epistemology” in print, and focused on demonstrating how an understanding of the ways in which social groups (as well as individuals) acquire knowledge can be applied in the design of information services to those groups (Egan & Shera 1952; Furner 2002; Furner 2004c). More recently, epistemologists such as Alvin Goldman have been concerned to give an account of the conditions under which social processes such as the provision and receipt of testimony can result in the acquisition of knowledge, and a number of philosophical analyses have been undertaken of trust, reputation, authority, reliability, and other criteria for evaluating the likelihood that information sources of various kinds will be productive of epistemically valuable beliefs (Goldman 1999; 2006; see also Wilson 1983).

4.3 ETHICS

Several branches of philosophy deal with questions of value or goodness, and with claims about the kinds of things that ought to be done in given situations. Social and political philosophy, for example, are concerned with the evaluation of public policy, and governmental activity, and group interaction, and with the analysis of socially valuable states such as justice and freedom. Aesthetics is concerned to establish criteria upon which works of art may be evaluated. Ethics is concerned with the rightness of actions in
general. Within ethics, some fairly fuzzy boundaries may be drawn between ethical
theory, meta-ethics, and applied ethics. Ethical theories propose criteria for distinguishing
between right and wrong actions; meta-ethics categorizes ethical theories and analyzes
the concepts and assumptions on which they are based; and projects in applied ethics
demonstrate the consequences of applying particular ethical theories as guides to action
in particular situations.

As we approach the end of the first decade of the twenty-first century, information ethics
is the most visible of subfields of philosophy of information. This is a field which already
has its own international association, its own journals, and its own handbooks (see, e.g.,
Himma & Tavani 2008). “Information ethics” is typically understood to include
“computer ethics,” and to emphasize questions about the ethical implementation and use
of information technologies, but rarely to the exclusion of more-general questions about
the ethical provision and use of information services (online or offline; computerized or
not). For the information policymaker, systems developer, or service provider, the
fundamental ethical question is, Who should have what level of access to what
information? The issues that tend to arise in the evaluation of rival answers to this
question include equity of access to information; intellectual freedom; information
privacy and confidentiality; and intellectual property (see, e.g., Fallis 2007). The
literature on each of these issues is large and straddles the boundaries between ethical
theory, meta-ethics, and applied ethics. Further research on meta-ethical categories and
concepts can only raise the profile of information ethics within mainstream philosophy
circles even higher.
4.4 OTHER BRANCHES

Other branches of philosophy upon which work in the information sciences has touched more than momentarily include philosophies of action, art, communication, education, history, language, law, logic, mathematics, mind, representation, science, and technology, as well as critical theory, hermeneutics, and phenomenology. A comprehensive review would require more space than allotted here. In an attempt to succinctly demonstrate the diversity of philosophical approaches that may potentially be taken in the information sciences, in this section a particular object of information-scientific study is selected, and a number of specific issues highlighted as ones that could be productively addressed from various, overlapping, philosophically informed perspectives. The selected object of study is the design of a service for the effective provision of access to relevant information resources or documents (i.e., a document retrieval or resource discovery system).

- What are documents? What kinds of things are they?—Metaphysics.
- What is the nature of the relationship between a document and the work that it instantiates? What is the nature of the relationships between a document and the classes of similar documents of which it is a member?—Philosophy of art; Philosophy of logic; Philosophy of mathematics.
- What do documents do? How do they “mean”? How do they inform?—Philosophy of representation; Philosophy of language; Philosophy of mind; Epistemology.
How do documents serve as evidence? How does the informational value of a
document relate to its evidential value?—Epistemology; Philosophy of science;
Philosophy of history; Philosophy of law.

What is the nature of people’s conscious experience of interacting with
documents, with information, with information services?—Phenomenology;
Hermeneutics; Philosophy of mind.

What is information? What is the difference between information, education, and
entertainment? What kinds of motivation do people have for choosing to engage
with information, education, and entertainment services? How do we evaluate
these interactions?—Metaphysics; Philosophy of action; Philosophy of education;
Philosophy of communication; Philosophy of language; Philosophy of value.

What is effectiveness? How do we determine how effective information services
are?—Philosophy of value; Philosophy of technology; Epistemology.

What is relevance? How does relevance relate to other epistemic values? How do
we determine how relevant a document is?—Philosophy of logic; Philosophy of
value; Philosophy of mind; Epistemology.

What is access? How does access relate to other socially important objectives,
such as preservation? In what ways are information services socially valuable?
How should access to information resources be distributed among members of a
given social group? How should resources be represented and organized so that
access is optimized?—Social and political philosophy; Ethics; Critical theory.

5 PHILOSOPHY OF THE INFORMATION SCIENCES
Some of the questions asked about the information sciences are philosophical questions. The aggregate of these questions forms the field of philosophy of the information sciences. On a strict view, philosophy and the information sciences do not literally overlap in this sense, since philosophy of the information sciences is a branch only of philosophy (specifically, of philosophy of science), not of the information sciences.

The goals of philosophy of the information sciences may be stated as follows:

- to locate and illuminate the position of the information sciences as a group of fields in the universe of inquiry: i.e., to understand their role in interpreting and changing the world, their internal structure, and their relationships with other fields;
- to provide justifications for any decision to engage in information-scientific research; and
- to provide orientations towards and directions for information-scientific practice by identifying the kinds of problems that are most significant, the kinds of questions that are most relevant, the kinds of methodologies that are most reliable, the kinds of answers that are most acceptable.

There are two general approaches to philosophy of the information sciences. One is more descriptive, passive, and socio-historical: the emphasis is on giving an explanatory account of what information scientists actually do, and what they have actually done, to
locate themselves in the academic universe, justify their decisions, and orient their practices. Another flavor of philosophy of the information sciences is more prescriptive, active, normative, and (it might be argued) genuinely philosophical: the assumption is that philosophy of the information sciences should determine what the information sciences should be about, now and in the future.

Some of the questions asked in philosophy of the information sciences are *metaphysical* questions. For example: Do the information sciences share a distinctive ontology, or a distinctive view of the kinds of things that exist in the world? The short answer here appears to be “No.” Any acceptance, explicit or implicit, of a proposition that a given category of things exists is an ontological commitment. Different theories in the information sciences, constructed by scholars working in different subfields, have different ontological commitments. Often, however, the precise nature of a theory’s ontological commitments will not be made clear at the time of the theory’s presentation, even though it may well be recognized that any evaluation of the theory will depend partly on an evaluation of those commitments.

Many of the philosophical questions that are asked about the information sciences are *epistemological* questions, in that they are motivated by a concern to understand the various kinds of knowledge that are produced, and the various processes by which knowledge is producible, in the information sciences. Even more specifically, such questions are normative, methodological questions about the ways in which research in the information sciences ought to be carried out—about the ways in which hypotheses
should be tested, results interpreted, and theories constructed. Again, we might ask: Do the information sciences share a distinctive methodology, or a distinctive view of how knowledge-claims might be generated and defended? And again the answer appears to be “No.”

One common way of distinguishing among fields of inquiry or communities of inquirers is to locate the fields or communities somewhere between two opposite poles according to their methodological assumptions. Kuhn (1962), for instance, distinguishes between those academic communities whose members generally find themselves in agreement about the kinds of question that they ought to be asking (and about the kinds of method that they ought to be using to arrive at answers), and those “preparadigmatic” communities that presently lack such consensus (but that continue to strive towards it). Becher (1994) develops a two-dimensional model that distinguishes between the “hard pure” (natural sciences and mathematics), “hard applied” (science-based professions, such as engineering), “soft applied” (social professions, such as education and law), and “soft pure” (social sciences and humanities). In Becher’s model and others like it, the hard–soft dimension roughly corresponds to a scientific–humanistic distinction. “Hard” fields are restricted in scope, studying a clearly-delineated range of physical phenomena with a limited range of tried-and-tested methods, with the positivist goal of establishing general, deterministic laws of cause and effect that can each be used to explain the occurrence of large numbers of discrete events. Members of “hard” communities tend to make objectivist assumptions about the nature of reality, of truth, and of knowledge: scientists typically proceed, for example, on the basis that it is possible to acquire
knowledge of “the” truth about “the” real world. “Soft” fields, in contrast, are more open to the study of complex, messy, lumpy problems, using a wide range of exploratory methods to come to interpretative understandings, both of the unique constellations of factors that produce particular events, and of the meanings those events have for individuals and for groups. Members of “soft” communities typically allow that our knowledge of the world (if not the world itself) is both socially constructed, in the sense that our beliefs are shaped not only by the ways in which we interpret others’ beliefs about the world, and perspectival or relative, in the sense that the “truth” (or goodness) of our beliefs may be evaluated differently depending on the evaluator’s present point of view.

Several communities of inquirers who have self-identified with a focus on information and information-related phenomena have a long tradition of soul-searching when it comes to locating themselves among the four quadrants of the Becherian model. Many commentators have drawn attention, in more or less exasperated tones, to the positivist nature of much of the research in the information sciences (see, e.g., Ellis 1984; Harris 1986), and such observations have usually been accompanied by impassioned calls for a “softening” (in the Becherian sense) of information research. These days, we are more likely to read about information studies’ hospitality to a plurality of approaches, the implication being that each of its different subfields can be comfortably located in different quadrants, or even that each of its topics or problem sets can be explored using multiple methods originating in different quadrants. Bates (2005), for instance, distinguishes nomothetic (hard, scientific, universal) from idiographic (soft, humanistic,
particular) approaches, and describes thirteen separate approaches to library and
information science that can be located along the nomothetic–idiographic spectrum.

Humanistically-oriented scholars are more likely to emphasize questions about the
relations between information and the following (among other phenomena): conscious
experience and the human condition; interpretation and sensemaking; meaning, language,
and discourse; ideology, race, class, and gender; identity and diversity; preservation and
cultural heritage; remembering and forgetting; narratives and stories; and aesthetic and
moral value. Several attempts have been made to develop complete epistemological
frameworks for such research, based variously on phenomenology, hermeneutics, critical
theory, and discourse analysis. An understanding of philosophy of representation, itself a
diffuse area, would appear to be a quality shared by proponents of the emergent view that
the information sciences are properly about the relation between people and (not
technology, nor even information, but) reality (see, e.g., Borgmann 1999).

Comparative evaluation of the propriety of rival approaches to the information sciences is
a difficult task. We could choose to ignore that the issue exists, or at least to deny that it
is important (other than perhaps from a socio-historical perspective), given that the
bundling up of questions and methods to form more-or-less distinct fields is essentially
arbitrary and varies historically and culturally according to how phenomena are perceived
rather than according to how the phenomena change in themselves. A more productive
approach might be to focus on establishing the criteria (truth, power, utility, etc.) upon
which different approaches may be evaluated, and the methods by which an approach’s “performance” against such criteria may be measured.

6 META-QUESTIONS ABOUT PHILOSOPHY

Just as there are meta-questions (philosophical, historical, sociological, and political) to be asked about the information sciences, there are meta-questions that may be asked both about philosophy of information and about philosophy of the information sciences. These include questions about when, where, and how philosophy of these kinds has been done, who it has been done by, and what motivations people have had for doing it. Such questions are asked by historians and sociologists of philosophy.

It is relatively easy to trace the histories of a few well-defined branches of philosophy of information: information ethics, information-theoretic epistemology, and social epistemology come to mind. But, taken as wholes, both philosophy of information and philosophy of the information sciences are diffuse, unbounded fields that lack scholarly associations, journals, textbooks, and reputations. The high-quality work that exists remains scattered, infrequently cited, and (one sometimes suspects) unread. The appearance in the early 2000s of several special issues of journals devoted to topics in philosophy of information demonstrates that the field is gradually attaining some degree of respectability within the information sciences (if not within philosophy); but, given the field’s lack of a clearly expressed identity, it is probably too early to expect any significant contributions to an understanding of its historical development. When that
history is written, it will assuredly be of great interest to scholars wishing to see how the kinds of philosophical questions asked in the information sciences, and the kinds of answers offered, have changed over the years, which long-standing assumptions and beliefs (if any) have been challenged by the various paradigm shifts that have been identified in the broader academy, and how social factors have played a role in those developments.

Some of the meta-questions about philosophy of information and philosophy of the information sciences are themselves philosophical questions. For instance, we may ask what kinds of questions ought to form the content of each field, and how each kind of philosophy ought to be done. Contributions to the general field of metaphilosophy, which examine the nature of philosophy and the nature of motivations to engage in philosophical thinking, may serve as provocative resources in this regard.

7 CONCLUSION

The intent of this entry has been to examine the influence of philosophy on the information sciences. As part of any general quest to understand the interdisciplinary nature of information studies (see, e.g., L. C. Smith 1992), we may well wish to look in the opposite direction and ask, To what extent do the information sciences contribute to “mainstream” philosophy? The short answer here is ... well, “Hardly at all.” The “trade deficit” produced by the imbalance between intellectual imports (from philosophy to information studies) and exports (to philosophy from information studies) could
doubtless be demonstrated bibliometrically (see, e.g., Cronin and Meho 2008 for a description of the kinds of method that might be used). Certainly, the frequency with which contributions to the literature of the information sciences are cited in the literature of philosophy is vanishingly low. Moreover, the respective statuses within the general philosophical community of philosophy of information (in the broader, pre-Floridian sense) and philosophy of the information sciences sometimes seem to be roughly on a par with that of the philosophy of pasta. Things may change in the future as increasing numbers of philosophers first find inspiration in information-related phenomena and subsequently become aware of the existence of an entire field that, for one reason and another, has often struggled to attract the academic respect for which it has yearned. The most philosophically interesting of contributions to the information sciences—those with the highest potential value for philosophy, if only they were to be disseminated appropriately—include the following:

- Marcia Bates’s definitions of fundamental forms of information (Bates 2006);
- David Blair’s analysis of the implications of contemporary philosophy of language for our understanding of information retrieval as a linguistic process (Blair 2002; 2006);
- Brien Brothman’s deconstruction of conceptions of record and evidence in archival discourse (Brothman 2002);
- John Budd’s evaluation of the prospects for a phenomenological approach to information studies (Budd 2005);
• Rafael Capurro’s assessment of the significance of intercultural information ethics (Capurro 2008);

• Ron Day’s critical-theoretic analysis of the discourse and rhetoric of the information society (Day 2001);

• Don Fallis’s development of epistemic value theory as an approach to the evaluation of information services (Fallis 2006);

• Luciano Floridi’s and Kay Mathiesen’s analyses of the moral value of information (Floridi 2002b; Mathiesen 2004);

• Bernd Frohmann’s discourse-analytic reformulation of traditional epistemological frameworks for the study of scholars’ information behavior (Frohmann 2004);

• Kenneth Einar Himma’s meta-analysis of justifications for the legal protection of intellectual property rights (Himma 2008);

• Birger Hjørland’s examination of the epistemological assumptions underlying the practice of library and information science (see, e.g., Hjørland 2005);

• Allen Renear’s examination of the metaphysical assumptions underlying the design of data models for library and museum catalogs (see, e.g., Renear & Dubin 2007);

• Keith van Rijsbergen’s (and colleagues’) demonstration of the utility of mathematical logic (including nonclassical systems of logic) for modeling the process of information retrieval (see, e.g., van Rijsbergen 2000); and

• Patrick Wilson’s and Elaine Svenonius’s incomparable explications of the philosophical foundations of bibliographic description and organization (Wilson 1968; Svenonius 2000).
8 REFERENCES


Budd, J.M. *Knowledge and Knowing in Library and Information Science: A Philosophical Framework*; Scarecrow: Lanham, MD, 2001.


Furner, J. Shera’s social epistemology recast as psychological bibliology. Social Epistemology 2002, 16 (1), 5-22.


Hjørland, B. Information Seeking and Subject Representation: An Activity-Theoretical Approach to Information Science; Greenwood: Westport, CT, 1997.


9 FURTHER READING
In the information sciences, the standard encyclopedic source is, of course, the one you are reading. The cumulative volumes of the *Annual Review of Information Science and Technology* (ARIST; Information Today: Medford, NJ, 1966–) are equally indispensable. There are several bibliographic databases that cover different portions of the field: one with good international coverage is *Library and Information Science Abstracts* (LISA; ProQuest: San Diego, CA, 1969–). The environment for scholarly publishing in the information sciences is very diverse, and different subfields are represented well by different publishers (e.g., information retrieval by Cambridge University Press; digital libraries by MIT Press; museum studies by Routledge). There is no single text that provides a comprehensive overview of philosophical concerns in the information sciences, but monographs by Blair, Budd, Cornelius, Day, Frohmann, Hjørland, Svenonius, and Wilson serve as philosophically sophisticated introductions to their respective areas, as do chapters in ARIST by Blair, Capurro and Hjørland, Cornelius, Day, and Fallis (all listed in “References,” above). Journals in the information sciences that carry philosophically informed articles on more than a very occasional basis include *Archival Science, Archivaria, Journal of the American Society for Information Science and Technology, Journal of Documentation, Library Quarterly,* and *Library Trends.* The Special Interest Group on the History and Foundations of Information Science (SIG/HFIS) of the American Society for Information Science and Technology (ASIS&T) regularly sponsors sessions of philosophical interest at annual meetings of ASIS&T, and the CoLIS (Conceptions of Library and Information Science) conference series is similarly receptive to philosophically themed papers.
Fig. 1. A semiotic model of the relationships between reality, thought, and language.

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<th>Real-world situations:</th>
<th>Mental representations:</th>
<th>Linguistic expressions:</th>
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<tr>
<td>Information as reality</td>
<td>Information as message, meaning, knowledge, image</td>
<td>Information as signal, vehicle, data, document, thing</td>
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