

The Landscape of Information Science: The American Society for Information Science at 62

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Founded in 1937 as the American Documentation Institute, the American Society for Information Science is 62 years old. Information Science includes two fundamentally different traditions: a “document” tradition concerned with signifying objects and their use; and a “computational” tradition of applying algorithmic, logical, mathematical, and mechanical techniques to information management. Both traditions have been deeply influenced by technological modernism: Technology, standards, systems, and efficiency enable progress. Both traditions are needed. Information Science is rooted in part in humanities and qualitative social sciences. The landscape of Information Science is complex. An ecumenical view is needed.

Introduction

The *Journal of the American Society for Information Science (JASIS)* is 50 years old, if, as one should, one counts its early years under the name *American Documentation*. There is a rather thin claim that *JASIS* is really now 61, because *American Documentation* was a conscious, if informal, revival of the *Journal of Documentary Reproduction*, published from 1938 until 1942 (Walker 1997, and, for an analysis of its contents by Z. Liu, see Buckland, 1996). Here I am concerned with the Society itself, founded in 1937, so I use 62 years. What should the Society be doing now? It is the answer to this question that should provide the context and the basis for dialog about “*JASIS* at 50.” What follows is a personal opinion piece on the environment of ASIS and on the Society itself.

ASIS is a very congenial society with excellent publications and fine conferences, but it is not as strong or as large as it could be. As we move forward into the so-called “Information Society,” ASIS seems to be coasting rather than soaring. There is a need for rejuvenation.

One thing we should not do is argue over what the phrase “Information Science” means. Such discussions start at the

wrong end. Names do matter. They influence attitudes, but, too often, energy is wasted in arguments about what words denote instead of following the constructive path of discussing the phenomena of interest separately from and prior to the quite different discussion of which names to use for these phenomena. The word “Information” is itself problematic because different phenomena get called “Information.” I have found it helpful to distinguish three kinds of phenomena commonly referred to as “information”: information as a cognitive process; information as knowledge imparted; and signifying objects (data, documents, and the like) are commonly referred to as “information.” Further, the word “information” is commonly used so metaphorically or so abstractly that the meaning is unclear.

Information, after all, is not very important in itself. It becomes so because of its relationship to knowledge. As Francis Bacon observed in 1597: “Nam et ipsa scientia potestas est.” Knowledge is power. He did not say, “Information is power.” Knowledge is power, because “Scientia et potentia humana in idem coincidunt, quia ignoratio causae destituit effectum.” (Human knowledge and human power meet in one, because where the cause is not known the effect cannot be produced.) Knowledge is empowering. Information, then, can, at most, be indirectly empowering to the extent to which knowledge is derived from it.

Two Traditions in Information Science

Although it is a considerable simplification, I think that it can be helpful to think in terms of two traditions, or mentalities, even cultures, that coexist in the area of Information Science: (1) approaches based on a concern with documents, with signifying records: archives, bibliography, documentation, librarianship, records management, and the like; and (2) approaches based on finding uses for formal techniques, whether mechanical (such as punch cards and data-processing equipment) or mathematical (as in algorithmic procedures).

A Document Tradition

The American Society for Information Science, founded in 1937 as the American Documentation Institute, was intended by its founders to extend in the USA the “Documentation” movement that had been growing in Europe. On both continents, it overlapped greatly with the development of information centers and specialized library services. In the late 19th century there was a great increase in the number of documents, especially articles in periodicals. What was later called the “Information Explosion” was, and is, a great increase in the number of documents in various forms. So, by the beginning of this century, document management was rightly seen as being of increasing importance, an expanding field concerned with collecting (selecting), preserving, organizing (arranging), representing (describing), selecting (retrieving), reproducing (copying), interpreting, translating, summarizing, and disseminating documents. This useful field seemed to some to be broader than, or, at least, different in its emphases from, bibliography or librarianship, so the name “Documentation” came to be used, until that was replaced by the grander phrase “Information Science.”

In a narrow sense, “Documentation” has been but one of several professional specialties concerned with managing documents. In a broad sense, “Documentation” includes the document life-cycle in archives, bibliography, libraries, records management, indexing, information retrieval, and the like. In this “document tradition” the importance of knowledge has always been known, and multiple objectives assumed, in the use of signifying documents: utility, education, recreation, literacy, communication, persuasion, support for decision making, and so on.

The logic of the document tradition has consequences that deserve greater recognition. First, if documentation has to do with the management of documents, what kind of documents are included? What kind of documents, if any, are excluded? In addition to printed texts, there is a long list of other forms and genres: manuscripts, graphics, three-dimensional documents (models, sculpture), and so on. And as digital versions become available, distinctions diminish. The logic of the document tradition is that it is, in principle, very open-ended, apparently including any thing that helps knowledge, regardless of the physical medium. “Nowadays one understands as a document any material basis for extending our knowledge which is available for study or comparison,” declared the documentalist Walter Schuermeyer in 1935, even though professional attention has remained focused on printed documents and digital databases (Buckland, 1991, 1997).

A second, related consequence of the “document” tradition is that Documentation—nowadays we are more likely to say Information Management or Information Science—has to do with knowledge, meaning, learning, description, language, and ambiguity, therefore, any view of it remains incomplete unless some roots in cultural studies, in the humanities and qualitative social sciences, is acknowledged.

The “document” tradition, in my view, entails acknowledging twin foundations, building not only on technique and technology (tools), but also human beings (tool users) as individuals, groups, and society, concerned with meaning and values. It can, therefore, be scholarly, but there are inherent limits on how far it can be “scientific.”

One largely forgotten example of a pioneer in the document tradition is the German chemist Wilhelm Ostwald (1853–1932), who was very concerned with improving the organization, dissemination, and utilization of knowledge. Most workers were organized by corporations, countries, or other institutions, but, he argued, intellectual workers, by the nature of their work, tended to be isolated, like islands. Therefore, for knowledge workers to be effective, we need to build bridges. (Today we would probably say “networks.”) Ostwald used most of his 1909 Nobel Prize money to found and support The Bridge (*Die Bruecke*), “an international institute for the organization of intellectual work,” in Munich in 1911, to develop and demonstrate tools and techniques. Unfortunately, The Bridge soon collapsed, but it left as a legacy a “world format” of standard paper sizes that became the present international ISO standard (A4, etc.), ideas about hypertext (then called “the monographic principle”), and about building a “world brain” (Hapke, 1997, in press; Sachsse, 1998).

A Computational Tradition

The “computational” tradition arises out of the success of algorithmic, logical, mechanical, and mathematical tools in other areas and efforts to extend their application to problems of managing documents. Obvious examples are punch cards, edge-notched cards, optical coincidence (“peek-a-boo”) and pattern recognition techniques, data processing, and digital computers. I would see Management Information Systems, DBMS, Artificial Intelligence, much of the work associated with the Association for Computing Machinery’s Special Interest Group in Information Retrieval, and, currently, much “digital library” work, as rooted in, or, at least, heavily influenced by, the computational tradition.

The computational tradition’s concern with efficiency and effectiveness is obvious, but concern for efficiency is also an underestimated historic strand of the document tradition. Both traditions have been deeply influenced by technological modernism: standards, codes and rules, systematic organization, purposive information systems developed cooperatively—machinery for collective progress! In the USA, Melvil Dewey is recognized as an extreme example of technological modernism in the document tradition. A modernist mentality has been pervasive in both traditions.

Complementary but not Convergent?

These two traditions seem to me to have different foundations and so unlikely to meld into one. However, for managing information one needs both, and they can be seen as complementary. As has been noted more than once, using

MIS and library services as comparison points, the formal tradition (e.g., MIS) has typically dealt with relatively simple alphanumeric records (predominantly date, name, count, code, or identification number), internally derived data that are strongly defined, computable, domain specific, and (mostly) relevant to operational and tactical decision making. The document tradition (e.g., library services) is typically concerned with nonnumeric documents, mostly derived from external sources, which are more or less literary in a broad sense, resistant to formal techniques (except in superficial ways), have weakly defined contents, and, because derived from and relating to the external environment, are likely to be relevant (sometimes) to strategic decision making. An explanation is that strategic decision making typically has to do with changed relationships with other organizations and statements from or about an external environment tends to be qualitative or ill defined.

This dichotomy is an oversimplification. It is also, arguably, increasingly out-of-date. Nonnumeric documents are increasingly digital (text, image, video), and are becoming more computable. Digital networks reduce the difference between internal and external sources. More and more, techniques developed in one tradition can, more or less, be used in others.

However, any convergence of diverse professional practices is likely to be inhibited because occupations are social structures, characterized by different educational programs, social differences (including gender, with Computer Science historically mostly male, and Librarianship mostly female), and different professional associations. Professional groups, keen to promote their own interests tend centrifugally to establish islands of professional practice ("art worlds"). Such structures inhibit personal mobility. For example, there has probably been very little movement of individuals between MIS and Librarianship.

University-Based Education

The university-based programs in Information Science, at least those with roots in Library and Information Studies, are stronger than is commonly assumed. The number and geographical availability of these programs have been increasing. The past few years has seen more innovation than at any time since the 1960s, and enrollments have grown substantially.

At my own institution, the University of California, Berkeley, teaching and research in my area has gone through four phases, combining continuity with significant evolutionary change: 1918–1945: *a small library school*—librarians educated librarians. 1946–1975: *a large library school*—the teachers were librarians and academics. Faculty engaged in research. Doctoral study was added. 1976–1994: *Information Management, with an emphasis on library services*—information retrieval was seen as widely applicable and studies of information in society received deeper attention. 1995 to date: *Information Management, including library services*—analysis and technique are em-

phasized with an even more ecumenical view of potential application areas.

The widespread change, internationally, from "School of Library Science" to "School of Library and Information Science" and on to schools of "Information," of "Information Management," of "Information Studies," and so on, can be viewed as expansion within the "document tradition." However, a problem with an expanded scope, whether in depth of analysis or breadth of application is that more extensive expertise is required. Some relief is possible by moving to a greater level of generality or abstraction, but abstraction carries risk if the complexity of real worlds becomes too neglected. It is reasonable for a graduate program (and for ASIS) to want to encompass, for example, information users and society, organization and representation of information, management of information organizations and services, economics of information, information retrieval, information technology, systems analysis, design, and implementation of information systems, information policy, law and information management, and so on. But to do that is likely to require individuals with backgrounds in communications, computer science, economics, information retrieval, librarianship, law, and diverse other fields as well as familiarity with professional practice in the application areas to be covered. A great range of expertise is needed if the scope is to be broad *and* superficiality is to be avoided. A small school cannot provide much breadth and depth and, if this complexity is present in professional education, how can it not also be present in a professional association?

The "Information Paradigm"

A recent book *Librarianship and the Information Paradigm* by Richard Apostle and Boris Raymond (1997) is refreshing because it challenges some of the rhetoric concerning change and convergence within the field of Information Science. Apostle and Raymond are primarily concerned to call into question what they regard as irresponsible planning by educators. They structure their challenge by explicitly identifying influential assumptions, which consciously or unconsciously form what they call the "Information paradigm." They then argue that each assumption is fallacious or inappropriate with respect to librarianship. Their arguments are not our present concern, but we can borrow these assumptions for a rather different purpose, adding our own comments.

- (1) "Information" is the basic concept upon which the paradigm rests. This is questionable because the word "information" has multiple meanings and, as Bacon said, it is knowledge that matters.
- (2) Postindustrial societies are "information societies." All societies are formed by communication. The difference is a matter of degree and of technology.
- (3) A merger of librarianship and information sciences is taking place. It takes a very limited definition of Information Science to make this assertion hold. There

seems to be some confusion between an area of professional practice and set of areas for study.

- (4) *"Information technology" is the driving force and the determiner of future functions of libraries and of the "information profession."* Technology defines available processes, not purposes. Beyond that, the mutual influences on each other of society and technology are complex.
- (5) *The needs of library users and the functions of libraries need to be reformulated in terms of "information needs."* Needs of library users include recreation and reading skills, as well as "facts."
- (6) *The concepts of "information industry" and "information profession" are interdependent.* A very simplistic statement.
- (7) *A convergence of library and information science education is necessary and evitable.* The assumption that previously differentiated fields of Information Science are converging has been widely stated over the years and deserves fuller discussion. This assumption is being increasingly seen as overstated (e.g., Cox & Rasmussen, 1997). There is scope for the recognition of underlying similarities and for technology transfer. Some techniques may well be widely applicable, but each application area, each island of professional art, remains richly and complexly different if examined carefully.
- (8) *Employment prospects for Library and Information Science graduates in the "emerging information market" are optimistic.* There are many specialized markets with specialized needs. The phrase "emerging information market" may be at too high a level of abstraction to be useful and may include markets for information-related technology that have only indirect connections with knowledge. The situation may have changed since, but in a 1983 analysis of the information economy, Michael Cooper (1983) argued that relatively little of the information sector, or of the growth in it, was related to information services.

One can question the formulation of these assumptions by Apostle and Raymond and their rebuttals of them. An important conclusion to be drawn, I suggest, is not that these (and other assumptions) are true or false, but rather that they are likely to be valid in some circumstances but not in others, as is the case with pricing policies. In some circumstances, treating information services as a market commodity may be appropriate, but not in others where public financing may well be preferred. Each assumption raises questions and becomes increasingly complicated if examined. Such examination can only reinforce the conclusion that we are dealing with a really complex landscape.

ASIS and its Environment

Information Science—the domain of ASIS—has had strong environmental influences, including:

- The growth of information technology, especially from about 1900 onwards;
- Complex relationships within the social structures of pro-

fessional practice and professional education. As one example, recall the generally stultifying and often destructive arguments of the 1960s about "information science versus library science";

- Deeply rooted changes in the information services sector as communications, libraries, publishing, and other services undergo radical technological and, therefore, economic change;
- The strong influence of technological modernism: Technology + Standards + Systems + Efficiency = Progress; and, pervasively,
- The move to digital technology.

I have found ASIS to be consistently the most comfortable and the most interesting of the societies in which I have participated. Given the prevailing rhetoric about the emerging "Information Society" and the origins and long-term interests of ASIS, one might expect the Society to be larger than it is and expanding. Why is it not?

Professional societies are said to be, in general, in decline and several explanations are plausible. Increasing instability and pressure in the work place makes for short-term concerns. Longer hours of work and the rise in two-career households leave less time and energy for voluntary associations. Pressures to acquire ever-changing technical skills increase the attractiveness of ad hoc professional development. "Boutique" societies for specialized occupations can appear to have advantages over those, like ASIS, with a broad and integrative approach. All human service organizations face chronic cost inflation to the extent that they are labor intensive.

The Board of Directors of ASIS has been discussing this issues and what are or might be "hot topics" for ASIS. Examples discussed included the following:

- Geographical Information Systems, a genre with many application areas;
- Digital Libraries, an ambiguous phrase used for the modernizing of library services, but also, more vaguely, for complex databases;
- Competitive Intelligence, the collection and analysis of information concerning others; and, its counterpart,
- Corporate Knowledge Management, the assembling and sharing of information within an organization.

One hears two rather contradictory statements about each example: first, that it is a topic long included among ASIS's members interests and so really nothing new; and, secondly, that it is a hot new field involving large expenditures and developing rapidly outside of ASIS.

Both statements appear to me to be correct. So what should the ASIS Board of Directors do? In my view each such "hot topic" should be seized and developed within ASIS's integrative perspective.

Consequences

A consequence of our assumptions for the "document tradition" of Information Science is that special attention

needs to be paid to judicious technological innovation, both for efficiency (doing the same things better) and redesign (doing different, better things). There is also an important distinction between research and development (ascertaining what is technically feasible) and innovation (deciding which technical feasible option to implement).

A consequence for the “computational tradition” of Information Science is that special attention needs to be paid to noncomputational aspects: to human behavior (information seeking, information avoiding, and the use and creation of documents); to human understanding and believing; and to the complex social characteristics of application areas in private, public, and nonprofit sectors. Just as in daily life we have to pay attention to both economic and political realities, so also if Information Science is to flourish we need to build with both the document and the computational traditions.

A Complex Landscape

I am increasingly impressed by the complexity of the “landscape” of Information Science:

- Many kinds of study (computing, mathematics, language, ethnography, semiotics, economics, law, etc.);
- Many specialized genres (e.g., geographical information systems, socioeconomic datasets, websites, etc.);
- Many application contexts (e.g., restaurants, libraries, travel agents, medical clinics, universities, etc.); and
- Varied ideological (economic, political, cultural) situations.

The landscape is complex in part because knowledge (and, therefore, information) is significant in all contexts. The problems and solutions do not seem to me to be becoming simpler. There may well be some possibility for adopting or adapting techniques and ideas found elsewhere. Reduced isolation and more open frontiers are likely to change isolated islands of information management into a large, complex landscape, not into a homogeneous field.

Is a general, ecumenical educational program in Information Science plausible? Such a program could easily be too superficial or too complex. Perhaps progress is more likely and more realistic with more or less specialized programs with an ecumenical perspective in which each program selects which parts of the terrain it will attempt to concern itself with, but incorporating both the document tradition and the computational tradition.

Similarly, I think that ASIS should be ecumenical in spirit, integrative of different areas, and, especially, having both academic and professional perspectives. But ASIS,

too, is unlikely to be able to cover all of the terrain in depth. ASIS is also unlikely to be able to avoid duplication or competition in any of its particular interests. But ASIS will, I hope, remain distinctive in its ability to combine multiple strands in an integrative way. In particular, a strong, dynamic ASIS will, especially through the enterprise of its Special Interest Groups (“SIGagility!”) seize and exploit the opportunities that old/new “hot topics” provide. It is a special opportunity for ASIS whenever a topic considered old within the society ASIS is regarded as new and worthy of major investments by people outside of ASIS. ASIS can have the best of both worlds by becoming a mall with an array of selected boutiques that change continuously and dynamically as the environment of ASIS changes.

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