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Defining the Object of Study: Actants in Library and Information Science

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Various definitions of information are used in the service of library and information science, a discipline that currently is in a state of flux. The discipline of Science and Technology Studies examines the production of scientific knowledge, and its methods are best used during times of instability in scientific disciplines. Arguments from Bruno Latour's *Pandora's Hope* are used with historical context to explain the co-evolution of librarianship and information science in the 20th century. Latour's circulating chains of reference model

illustrates how real-world phenomena are gradually abstracted into scientific ideas and artifacts. The information thus produced becomes the chief actant in library and information science. These chains have five main components: links and knots, public representation, alliances, autonomization, mobilization of the world. Illustrative examples are given relating each component to library and information science, and an alternative definition of information is developed from this model.

Introduction

A very typical article in library and information science (LIS) journals will frequently begin by asking: "What is information?" and then will answer itself: "It is that which reduces uncertainty. It is that which assists in decision-making" (Fabisoff and Ely 1976, 1). Consider this example from page one of an introductory information retrieval text (emphasis in original):

To know what information retrieval is, we must first know what *information* is. There is no fully satisfactory definition Temporarily, consider the oversimplified characteristics that information is something that (1) is represented by a set of *symbols*, (2) which are *organized* or fit into some *structure*, and (3) can be read and to some extent understood by *users* of information (Meadow et. al. 2000, 1).

One would be hard pressed to find another field of scientific inquiry in which every research-

er gets to define the primary object of study for himself. Imagine if every chemist had to state to which definition of matter she was going to adhere, or if a biologist was forced to define life at the beginning of every lab report. The truth of the matter is that there was a time when a chemist would have started an explanation of a new experiment or theory with just such a definition, allying himself with one or another school of thought. The fact that library and information science is currently in just such a time gets lost in the debate regarding whether or not the word "library" should appear in the names of schools and professional organizations. A core set of concepts has yet to be agreed upon. Facts are in dispute. The vocabulary of the information professions is in a high state of flux. Information, the chief object of study, is still being defined at the beginnings of papers. None of these makes the work being done any less a scientific endeavor or professional discipline.

Science and Technology Studies (STS) practitioners would argue that LIS is a prime target for their inquiries precisely *because* nearly everything that happens in contemporary librarianship and information science happens ‘on the edge’ – what Jay Labinger calls “frontier science” (Labinger 1997, 214). Thomas Kuhn would consider these times of shifting paradigms (Kuhn 1962). Part of this is a function of being an extremely new science. Librarianship did not take on the moniker and methodologies of science before the Carnegie Foundation funded the University of Chicago’s Graduate Library School, whose faculty was made up primarily of social scientists – not librarians (Harris 1995, 292). The term information science only supplanted documentation in the early 1960s, and not officially until 1968, with the American Documentation Institute changing its name to the American Society for Information Science (Lilley and Trice 1989).

If only Melvil Dewey had voiced an opinion regarding his “mechanical art” (Harris 1995, 291) becoming a science before his death in 1931 – ten years after the founding of the Graduate Library School. Likewise, how closely Norbert Wiener and Vannevar Bush identified themselves with librarians must forever be a matter of speculation. How current practitioners align themselves can perhaps be determined by using the methods of STS.

The debate regarding what to call ourselves should be viewed in the light of these complementary, but frequently competing, recent histories. Within these contexts, information scientists and librarians are working to stabilize a core set of concepts, evolving criteria by which to judge the quality of research, and even more basically, deciding on appropriate topics for research and development. STS does most of its work on this type of frontier precisely because of this high rate of change: studying the evolution of knowledge during times of great change is much more interesting than studying it during times of stasis. Certainly, research ‘on the edge’ of knowledge is also where scientists are most often wrong, but the job of STS is to comment on the process of science – not the validity of individual results.

Science and technology studies

STS’s earliest work was by feminist anthropologists casting a critical eye toward the practice of

anthropology (Franklin 1995, 169). Sociologists and anthropologists then turned this technique toward the observation of natural scientists in their natural habitats: in labs and in the field. Historians of science, philosophers, cultural theorists, and literary critics have also come to embrace some of these methods, searching for science’s influence on society at large, and vice versa. Along the way, controversy has arisen as some scientists have revolted against being treated as lab rats by those with no scientific credentials, and others have ridiculed the whole exercise as “merely incomprehensible language masquerading as knowledge” (Fujimura 1998, 348).

These controversies have become known collectively as the Science Wars, and have been characterized not so much by individual battles as by individual characters and emerging bodies of scholarship. Card-carrying scientists turned literary theorists and cultural critics (Donna Haraway, Catherine Hayles and Andrew Pickering, to name only three of the most visible) have opened up whole new fields of inquiry. Along the way, nearly forgotten fields such as textual studies and analytical bibliography seem to have received new leases on life.

Circulating chains of reference

Rather than adding to the Science War chronicles, I would like to apply two key models from Bruno Latour’s *Pandora’s Hope* – which exhaustively defends the work of science studies by giving it a thorough grounding in epistemology, phenomenology, and semiotics [1] – and apply them to librarianship and information science in an effort to decide if these are separate pursuits, or two aspects of the same discipline.

The first model is that of circulating chains of reference. This should be of interest to librarians, if not just for its oxymoronic name, then because much of the information enterprise revolves around managing the last links of all the sciences’ and humanities’ chains – the journal articles, conference proceedings, and monographs that are the end result of field work, laboratory experiments, scholarly studies, and creative endeavors. These products are intimately familiar to librarians, indexers, and developers of retrieval systems – so familiar that they are frequently mistaken as being in the domain of the informa-

tion professions, when they, in reality, are only charged with ensuring the safekeeping and ready access of these products.

At the opposite end of the chain of reference, for the sciences at least, the first link is some measurement of an object in the world. For Latour, this measurement is the translation of a fact, through some sort of an instrument, into a word or a number. As the world slowly moves onto the shelves of libraries, “there is ... a complete rupture at each stage between the ‘thing’ part of each object and its ‘sign’ part” (Latour 1999, 60). Latour spends an entire chapter tracing this chain: a botanist, a pedologist (a soil scientist), a geologist and a sociologist (Latour himself) examine the junction between a savanna by laying on a map on a table in a restaurant in South America; the map’s graticule is then transposed onto the landscape by pounding stakes into the ground at the points of the grid, found by measuring the distance from previously surveyed trees, soil samples are taken at points along the grid, deposited into a matrix of cubes (called a pedocomparator) that correspond to their original locations, brought back to the restaurant tabletop for simple ‘tasting’ [2] and color analysis. Finally conclusions are drawn, quite literally, in a journal article whose main illustration was produced on that same restaurant table where the story began.

At each of these stages, one ‘thing’ stands in for another. The diagram and text produced in the above example bear little physical resemblance to the forest/savanna juncture, but by tracing the origin of each reference, one is able to move back toward the field and verify the scientists’ conclusions.

Like the footnotes used in scholarly works to which the inquisitive or the skeptical ‘make reference’ ... this armful of specimens will guarantee the text that results from [the] field expedition. (Latour 1999, 34).

These inquisitive and skeptical people use the tools created by librarianship, the chains of reference of information science, to trace these citations – backward chaining in librarian-speak. A simple chain of reference for a library is easy to articulate: a library decides what sorts of materials to collect based on the wishes of its constituencies; some sort of formal collection policy is established; classification schemes are picked

so that topics can be explored via surrogates instead of having to navigate the source materials directly; a storage scheme is picked and (possibly) mapped onto a physical structure so that individual items can be found once they are identified.

A more generic information storage and retrieval system might be a little harder to understand in this way, but the basic purpose is the same: to erase the boundaries between descriptions and the entities described. In an ideal system, we would

never detect the rupture between things and signs ... We [would] see only an unbroken series of well-nested elements, each of which plays the role of sign for the previous one and of thing for the succeeding one (Latour 1999, 56).

In fact, librarians do this so well that they have started to complain that users cannot tell the difference between distinctly different resources.

Each of these elements can be called an actant, a term Latour borrows from semiotics. An actant is any participant in an endeavor, whether human or nonhuman. An actant is defined by what it does, in essence, what function it performs within a discipline. It emerges through trials (experiments, tradition, practical application), and once its fellows (usually human actants in the discipline) deem that it performs adequately (through a regularized process, such as peer review or commodification), it is admitted to an institution.

The circulatory system of information science and librarianship

The chain of reference described above was said to circulate, and while reference materials do not ordinarily circulate, Bruno Latour’s do. In his circulatory system, actants move along five intertwined loops: mobilization of the world, autonomization, alliances, public representation, and links or knots between these loops.

Links and knots

Links and knots are perhaps the easiest part of Latour’s circulatory system to understand, even though he struggles not to define them too precisely. These are connections between the other four loops, and they exist to constantly feed the

whole system with the content of science – the core concepts, practices, and intellectual products of science live in these knots. Without these links and knots, there are no other loops, but at the same time, without the other loops, the content of science withers away and dies.

For information science, links and knots include all those theories and tools that are borrowed from other disciplines: information behavior (simply ethnographic studies from anthropology), information transfer (communication theory by any other name), systems theory (from whatever circle of hell will claim it), and our complete misreading of information theory (from engineering and mathematics).

It was the combination of these methodological and theoretical actants that created a science from documentation studies. While the groundwork was laid by the social scientists at the University of Chicago in the 1920s, it was the explosive growth of scientific information during World War II that inspired engineers, chemists, and documentalists to invent systems that could handle the ever-increasing flow of scientific papers: selective dissemination of information (SDI), Keyword-in-Context and Keyword-out-of-Context machine indexing (KWIC/KWOC), *Index Chemicus*, and ERIC are all techniques and systems that have their genesis outside of the library (Lilley 1989).

Notice that no 'native' library science concepts were included in the above discussion. At the time, these systems were being developed because Dewey's traditional 'library machine' was being crushed under the weight of all the new information being produced. This period shows that librarians, up until this point, had simply been the professional caretakers of information. It was the chemists, engineers, mathematicians, and cyberneticists who began to develop ways of managing this new volume of information. That these newly christened documentalists chose libraries and library schools as a home to conduct their research and refine their new techniques is perhaps a quirk of history – perhaps librarianship was simply the easiest domain to conquer. Or perhaps librarianship looked at this rapidly evolving field and saw its ability to manipulate information in ways that are obviously good, and saw its own reflection. It certainly adopted the new tools and methods quickly enough.

In this process, librarianship was taught to treat information as an independent actant, which not only demanded study (spawning information retrieval and the expansion of classification to include indexing, abstracting, and a renewal of a philosophical look at knowledge organization), but also whose use demanded study (begetting the study of information behavior). However, if information science now abandons libraries in favor of treating information as a free floating entity, divorced from any sort of bibliographic context, if all research and development efforts are put into the market economy, if information science becomes a slave to private research dollars just because that is where is currently having the most success, and if libraries are converted to massive public-access computing facilities, then information science will be in danger of losing not only its best public face (see the next loop), but also the only collective history to which information science can lay claim.

Public representation

The second loop, public representation, is frequently denied by scientists. (This is as if it were possible for science to exist in a vacuum. If nothing else, STS has done a very good job of putting that notion to rest.) Public representation is an easy concept to grasp: science has a public face, and this face must be acknowledged and it must be carefully protected so that work can continue. For the past five years information science has been able to shake off the dowdy image of bespectacled matrons in drafty reading rooms and take advantage of the emergence of the Internet as a public phenomenon, but this actant is currently taking a beating at the hand of viruses, child pornography, failing dot-coms, and the abuse of privacy.

Perhaps search engines will emerge as the exemplary public face of information science. Certainly they are the biggest implementation of IR ever, and have done more to bring concepts like recall and relevancy to a wider audience than any bibliographic instruction program ever has or any information literacy program ever will. This notoriety is, of course, a two-edged sword, as poor precision and excessive recall are not concepts we necessarily want to hear people talking about in pubs and on buses.

Alliances

Alliances form the third loop of the circulatory system. These alliances are the interactions that the field has outside of its immediate sphere of influence that are required to get work done. This is something that must be created, Latour argues, because the connections are never self-evident or natural. Certainly librarianship continues to have strong ties to our communities through our public libraries. Medicine, engineering, and the natural sciences continue to be strong clients – if only because they would collapse under the weight of their own information without someone to manage the still increasingly large volumes of information.

A new phenomenon, rather shocking for some, is that many practitioners are moving into the private sector, forging alliances that failed with Dewey's Library Corporation in the 19th century (Yates 1989). Perhaps these frequently young and recently trained information professionals are the advanced guard for information science as they seek the more lucrative pastures of the corporate world. As private organizations increasingly replace the government and large institutional libraries as sponsors of research [3], they will be more comfortable if this inclination toward information science has been "made to appear, in retrospect, inevitable," by our advanced scouts. The goal here can be seen as placing the discipline "in a context sufficiently large and secure to enable it to exist and endure" (Latour 1999, 104). The danger, in this author's opinion, is in casting the net of context so widely that it loses its shape and focus. If information is everywhere and constantly in use and it is all within the purview of information science, then what is out of its scope? At that point, what would separate it from any other discipline? At least the library has well defined borders – even if they have recently expanded to include remote services.

Autonomization

The fourth loop, autonomization, is the process by which "a discipline, a profession, a clique, or an 'invisible college' becomes independent and forms its own criteria of evaluation and relevance" (Latour 1999, 102). This loop also involves the formation of associations and schools, and it

is this loop that is currently causing us so much pain regarding what we call ourselves, and how we train ourselves. But just as the Science Wars have barely registered with scientists, and almost not at all with the general public, the 'L-word Wars' are but a minor blip.

Autonomization is an appropriate place to revisit the naming issue yet again. "Library science," a term purposely avoided in this paper, was a short-lived moniker – a transition perhaps between "librarianship" and "information science." "Information science" is not much better, better than "documentation," but it still elicits blank looks at cocktail parties. Does it simply give librarians someplace to hang their hats in the academy while studying what information is, how it acts, and where it accumulates? Librarians, along with a host of other people that do not self-identify as information scientists, are responsible for preserving these accumulations of our human memory in all of their forms. They are responsible for ensuring that scholars, ordinary folk, workers, and future generations all have access to the information they require, or about which they are simply curious. Whether we refer to information bound to a page by Gutenberg, or freed into the ether by Claude Shannon, we are responsible for it, and must do our best to be good stewards.

Mobilization of the world

This leads us to our final loop: mobilization of the world. This refers to the ability of science to move pieces of the natural world around with us. Latour and his party picked up the soil and moved the boundary between forest and savannah into the restaurant-cum-laboratory, and then into the journal article. The actants in this loop are the instruments and equipment that allow scientists to measure, detect, sample, and describe. For librarianship and information science, this obviously includes the tools used to transfer documents and descriptions of documents with ease – in essence, the tools used to make information move independently of its substrate.

It is this independent motion that leads to the object of study for both librarianship and information science. What these two intertwined fields mobilize are not measurements, detections, samples, and descriptions. What moves is information. As information moves through the world,

information scientists can, in turn, measure it and its motion. Librarians can manage it and organize it – in short, it can be harnessed to serve a purpose. It tends to aggregate in great big piles: in libraries, on the Internet, in large organizations. These aggregations, in turn, tend toward autonomy – with their own rules of evaluation and relevance. Along the way, our information in motion forms alliances with other actants to enhance its ability to move, to increase its power in the world, and thereby increase its chances of survival. The faster it moves, the more power and influence that it has, the more likely it is to be noticed by the public. Information, when viewed in this way, forms its own chain of reference.

Now it becomes obvious that information is the core concept that binds information science and librarianship together – both the object of study for the scientist, and the object of work for the librarian. The urge to define information is not the end goal of our endeavor, is it simply one starting point. The imaginary biologist with whom we began this paper is not forced to define life at the beginning of every lab report. To be sure, there are biologists that debate the issue, but it does not prevent them from doing work.

Notes

1. It might be this thoroughness that gives so many scientists pause when reading works such as this – it is not the most accessible book in the world. Latour himself posits that “good scientists enlist in the science wars only in their spare time or when they are retired or have run out of grant money,” and “scientists spend only a fraction of their time purifying their sciences and, frankly, do not give a damn about the philosophers of science coming to their rescue” (Latour 1999, 19).

2. Tasting is the process of judging the relative sand and clay content of soil by spitting onto a sample and rubbing it between one’s fingers. The description of this scientific process more than makes Latour’s book worth its price.
3. I include large institutional libraries as centers of research because they so often implement projects of large scope that frequently appear in the literature. These libraries also form alliances with technical experts who may, but frequently do not, consider themselves information scientists.

References

- Faibisoff, Sylvia G. and Donald P. Ely. 1976. “Information and Information Needs.” *Information Reports and Bibliographies* 5(5).
- Franklin, Sara. 1995. “Science as Culture, Culture as Science.” *Annual Review of Anthropology* 24: 163–84.
- Fujimura, Joan H. 1998. “Authorizing Knowledge in Science and Anthropology.” *American Anthropologist* 100(2): p. 347–60.
- Harris, Michael H. 1995. *History of libraries in the western world*. Metuchen, N.J.: Scarecrow Press
- Kuhn, Thomas S. 1962. *The structure of scientific revolutions*. Chicago: University of Chicago Press.
- Labinger, Jay A. 1997. “The science wars and the future of the American academic profession.” *Daedalus* 126(4): p. 220–21.
- Latour, Bruno. 1999. *Pandora’s Hope, Essays on the Reality of Science Studies*. Cambridge, MA: Harvard University Press.
- Lilley, Dorothy B. and Ronald W. Trice. 1989. *A History of Information Science 1945–1985*. San Diego: Academic Press.
- Meadow, Charles T., Bert R. Boyce, and Donald H. Kraft. 2000. *Text Information Retrieval Systems*. Second Edition. San Diego: Academic Press.
- Yates, JoAnne. 1989. *Control through communication: the rise of system in American management*. Baltimore: Johns Hopkins University Press.