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Library and Information Science

David Bawden and Lyn Robinson
City University London
d.bawden@city.ac.uk
l.robinson@city.ac.uk

Abstract
Library and information science is the discipline which studies the information communication chain: all aspects of the creation, organization, management, communication and use of recorded information. It supports the professional activities of the collection disciplines, including information management, librarianship, archiving and records management. Its core areas include information behavior, information organization and metadata, information seeking, information retrieval, information architecture, information society, information law and ethics, information management and policy, bibliometrics and library services. Library and information science is regarded as a meta-discipline, with a wide variety of applicable theories, philosophical bases and research methods. The discipline is undergoing changes as it adapts to new forms of documents and collections, and to new information environments.

Main text
Library and information science (LIS) is the academic discipline which studies all aspects of the creation, organization, management, communication and use of recorded information. It underlies a variety of professional activities such as information management, librarianship, and archiving and records management, educating professionals for work in those areas, and carrying out research to improve practice.

Librarianship, archiving and other practices dealing with recorded information have a history of thousands of years, but the origins of the LIS discipline are much more recent. The Bavarian librarian Martin Schrettinger used the term *bibliotekswissenschaft,* which may be reasonably translated "library science," in 1808, to encompass the tasks of cataloguing, classification, shelf arrangement and library management, and was the first to argue for formal training of librarians. The late nineteenth century saw university-level training established for librarians, with postgraduate education in 'library science' explicitly established by Pierce Butler at the University of Chicago in the 1930s.

Information science emerged later, in the mid-twentieth century, from the documentation movement of Paul Otlet, and from the special libraries and industrial information sector, both of which sought to establish more detailed control of the burgeoning scientific and technical literature. The term itself was first used in the 1950s, and the first academic courses in the subject established at City University London in 1961 (Bawden & Robinson, 2010). These developments culminated in the establishment

of the first university department of "Library and Information Science," at Pittsburgh in 1964; numerous other departments changed their names to match.

Since then, LIS has had a somewhat checkered career as an academic discipline, perhaps with an on-going identity crisis (Vakkari, 1994; Dillon, 2007). Some academic departments have dropped the L-word from their titles, rebranding themselves as "Information Studies" or "Information Schools." This reflects concern about whether LIS is a coherent academic discipline at all. The most consistent complaint has been that, while information is a valid discipline, "library science" is an oxymoron, since librarianship is a profession (see, for example, Cronin, 1995). There have also been distinct national variations in the ways in which the subject is understood; see, for example, Robinson & Bawden (2013) and Ibekwe-SanJuan (2012), for the British and French perspectives respectively.

Despite these vicissitudes, LIS remains a recognized discipline, and is, if anything, undergoing something of a renaissance in recognition, associated with a revived interest in documents and documentation as a subject for study. This may be because it is, in practice, difficult to draw a clear distinction between the two aspects of the discipline. It is more a matter of orientation and emphasis. Information science focuses on information in all its aspects and manifestations, on information in specific domains and contexts, and in technology applications; indeed, the term "information science" is sometimes confusingly used to denote information technology. Library science focuses on collection management, and on services to communities and culture. However, the overlaps in interest are so great that it is sensible to think of a single discipline; particularly in view of the greater integration between the aspects of the GLAM (galleries, libraries, archives, and museums) sector in an increasingly digital world.

What kind of a discipline LIS is has also been a matter for continued debate. Library science emerged from the arts and humanities, information science from the social sciences and technology. One consequence has been that LIS departments may be found located in many different parts of the academic structure in different institutions; from social science faculties to business schools, and from computing and technology to education and humanities. This is not surprising, as LIS is generally regarded as a broad field of study, with a pluri-, multi-, trans-, meta-, and inter-disciplinary nature (Ibekwe-SanJuan et al., 2014).

There are very clear overlaps between LIS and related disciplines. Among the more important are: computing and information systems (recognized by the emergence of "iSchools," which seek to combine the two disciplines); media and communication studies (recognized in the 2014 UK REF research evaluation, which combined these disciplines); publishing; and the "collection disciplines," including museum studies, archiving, and cultural/heritage studies.

This in turn means that LIS tends, reasonably enough, to adopt a wide variety of theoretical perspectives and empirical research methods. There have been a number of over-arching paradigms: the systems paradigm, focusing on quantitative assessment of the operation of library and information systems; the cognitive paradigm, focusing on the individual and his or her state of knowledge; the socio-cognitive paradigm, focusing on the shared information practices in social groups; and others. These have been accompanied by a plethora of research methods, quantitative and qualitative, positivist, realist, constructivist and interpretivist. In some respects this plurality is a strength, but the criticism has been made that LIS does not have a strong theoretical base of its own, and is too reliant on borrowing techniques and perspectives from a variety of other disciplines. This viewpoint seems to be changing, as there is evidence that other disciplines, particularly in the social and cultural sciences, are adopting some of the methods, results and theoretical perspectives of LIS.

It is undeniably true, however, that there is no single philosophical underpinning for LIS. Karl Popper's objective epistemology has been claimed as a basis for information science, and Jesse Shera and Margaret Egan's social epistemology as a similar basis for library science. More recently, Luciano Floridi's philosophy of information has been proposed similarly for LIS (Floridi, 2002), and it does seem to be that this will indeed be a valuable foundation.

The specific theories and frameworks of LIS may be located in all three paradigms, from the systems-centred to the human-centred, the latter on a spectrum from individual cognition and behaviour to group practices. They are very diverse in nature; they can only be mentioned in outline here, for more discussion see Bawden and Robinson (2012) and Case (2012). The systems paradigm encompasses mathematical, statistical and logical models of information theory, information retrieval, classification and ontology, as well as bibliometric laws, and models and metrics for evaluation of system s and services. The cognitive approach has spawned Belkin's influential 'anomalous state of knowledge' theory, and the sense-making approaches of Kuhlthau and Dervin. In the socio-cognitive paradigm is Hjørland's 'domain analysis', which focuses on knowledge domains as a theoretical construct.

The most prevalent form of LIS theory is the extensive set of conceptual models of human information behaviour, located, according to their nature, across all three paradigms. Best known is the family of process models due to Wilson, but there are numerous alternatives, including Erdelez' information encountering, Huvila's information ecology, Savolainen's model of everyday life information practices, Bates' information search models, and a variety of models for information and digital literacy.

There has been surprisingly little overlap between LIS information behaviour models, and communication models, although some recent studies have compared and combined LIS models with those of Rogers and of Maletzke (Robson and Robinson 2013).

As a university subject, LIS is generally taught at postgraduate (master's) level in the UK and in North America; elsewhere in the world bachelor's degree study is more common. The main international associations for the field are the Association for Information Science and Technology (formerly the American Society for Information Science and Technology); the Special Libraries Association; the International Society for Knowledge Organization (ISKO); the International Federation of Library Associations and its numerous groups and sections; the Documentation Institute; and the iSchools caucus. Numerous national associations typically cover both academic and practitioner interests; some explicitly cover the whole LIS spectrum, for example the UK Chartered Institute of Library and Information Professionals (CILIP). The major academic journals of the field, whose titles reflect its variegated nature are J*ournal of the Association for Information Science and Technology*; *Journal of Information Science*; *Journal of Documentation*; *Information Processing and Management*; *Journal of Librarianship and Information Science*; *Library Trends*; and *Information Research*. The major publishers of LIS monographs are Facet, Neal-Schuman and MIT Press. The main international academic conferences in the subject are Conceptions of Library and Information Science (CoLIS); iSchools iConference; conferences of the Association for Information Science and Technology; Information Seeking in Context (ISIC); and Libraries in the Digital Age (LIDA).

There is no canonical list of topics which fall within the remit of LIS. A typical set of the components making up the subject is: nature of information, documents and collections: information theories and philosophies; information history; information organization and metadata; information behavior and practices; information and digital literacy; information seeking and retrieval; information architecture; human-computer interaction and user experience; information and library systems and technologies; bibliometrics and scientometrics; library and information management and policy; knowledge management; collection management; records management and archiving; information law and ethics; LIS research methodology; information society and social informatics; publishing and dissemination; scholarly communication; and library and information services to organizations and communities.

These topics can be summarized as the elements of the "communication chain" of recorded information (Robinson, 2009). These elements are described differently by different writers, but typically comprise: creation; dissemination; collection; storage; organization; indexing and classification; processing; retrieval; communication; use; and preservation. These form the core of academic courses in the subject, and are the subjects of its research and study.

A vocational equivalent, giving another perspective on the scope of LIS, is CILIP's Professional Knowledge and Skills Base, which has eight areas of professional expertise: organizing knowledge and information; knowledge and information management; using

and exploiting knowledge and information; research skills; information governance and compliance; records management and archiving; collection management and development; and literacies and learning.

As the information environment changes, and the world of printed information in which it was born fades away, doubts have been cast of the future relevance of the LIS discipline. However, the need for the study of the communication of information, and actions to improve it, is just as great in the age of Google and Wikipedia, with its pervasive digital information environment.

Changes in the theory and practice of LIS since 2000 can be summed up as a broadening of the topics of its attention. Interest is moving far beyond formal published information sources, to encompass all forms of information resources and documents, and beyond a concern for serving professional and academic groups to encompass everyday life information needs. There are increasing overlaps between LIS and education, advice giving and general communication activities. There is added focus on demonstrating impact of information, and on user experience in information use. LIS practitioner roles are extending beyond custodian and intermediary, to include curator, designer and advisor.

In the future, new types of document and collection, new technologies, media and forms of publication, all pose problems for the effective communication of information. New physical and virtual information environments bring the need to understand the novel information behaviors which will result. New forms of information and digital literacy which will be needed, to enhance communication in diverse cultures and communities, and to overcome the dangers of an increasing digital divide, within and between communities and nations. This sets a new research agenda for LIS (see, for example, Dillon, 2007, and Buckland, 2011), as well as posing future challenges for its practitioners. While it is not possible to predict the changes which this will bring for LIS, they are likely to include a closer focus on the central issue of documentation, as well as a closer integration with media and communication studies, with information architecture and design, and with the digital humanities.

SEE ALSO: Design; Dissemination; History; Humanities; Information; Information Society; Information Theory; Social Sciences; Sociology of Knowledge

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Keywords
Information systems; Media literacy; Models of communication

Author Biographies
David Bawden is Professor of Information Science at City University London, and editor of Journal of Documentation; his main interests are information theories and philosophies, and information organisation. Lyn Robinson is Reader in Library and Information Science at City University London, and author of Facet's 'Understanding Healthcare Information'; her main interests are new forms of documents, information behaviour and information history. They are joint authors of Facet's best-selling 'Introduction to Information Science' text, and co-editors of Facet's 'Foundations of the Information Sciences' monograph series.