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IFLA (The International Federation of Library Associations and Institutions) is the leading international body representing the interests of library and information services and their users. It is the global voice of the library and information profession.

IFLA provides information specialists throughout the world with a forum for exchanging ideas and promoting international cooperation, research, and development in all fields of library activity and information service. IFLA is one of the means through which libraries, information centres, and information professionals worldwide can formulate their goals, exert their influence as a group, protect their interests, and find solutions to global problems.

IFLA's aims, objectives, and professional programme can only be fulfilled with the cooperation and active involvement of its members and affiliates. Currently, approximately 1,600 associations, institutions and individuals, from widely divergent cultural back-grounds, are working together to further the goals of the Federation and to promote librarianship on a global level. Through its formal membership, IFLA directly or indirectly represents some 500,000 library and information professionals worldwide.

IFLA pursues its aims through a variety of channels, including the publication of a major journal, as well as guidelines, reports and monographs on a wide range of topics. IFLA organizes workshops and seminars around the world to enhance professional practice and increase awareness of the growing importance of libraries in the digital age. All this is done in collaboration with a number of other non-governmental organizations, funding bodies and international agencies such as UNESCO and WIPO. IFLANET, the Federation's website, is a prime source of information about IFLA, its policies and activities: www.ifla.org

Library and information professionals gather annually at the IFLA World Library and Information Congress, held in August each year in cities around the world.

IFLA was founded in Edinburgh, Scotland, in 1927 at an international conference of national library directors. IFLA was registered in the Netherlands in 1971. The Koninklijke Bibliotheek (Royal Library), the national library of the Netherlands, in The Hague, generously provides the facilities for our headquarters. Regional offices are located in Rio de Janeiro, Brazil; Pretoria, South Africa; and Singapore.

Social Science Libraries: Interdisciplinary Collections, Services, Networks

Edited by
Steven W. Witt and Lynne M. Rudasill

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FOREWORD

This volume focuses on practical and empirical accounts of organizational change as it is occurring in the social sciences and impacts upon the professional skills, collections, and services within social science libraries. The questions raised relate to the changes that are occurring in the disciplines we serve and in the libraries in which we work. Are these changes real or falsely perceived? What is truly interdisciplinary work and what is multi-disciplinary work? Is subject integration occurring in some areas? How can librarians facilitate moving from knowledge silos to a more commonly shared understanding of the social sciences?

Section One focuses upon the question of interdisciplinary within social science libraries and the role of libraries to both react to and facilitate paradigm shifts in research and science. Section Two focuses on the rise of data as a resource to be collected and shared within social science libraries. Section Three focuses on the role of librarians to facilitate the development of social organizations that arise around new technologies and research communities. The editors contextualize the development and trajectory of new research practices and their impact on social science libraries in chapters one and ten.

Each chapter is a direct result of the IFLA Social Science Libraries Section's 2008 conference titled *Disappearing disciplinary borders in the social science library – global studies or sea change?*, which took place August 6th – 7th, 2008 at the University of Toronto's Faculty of Information (FI).

The conference focused on changes within the social sciences and ways in which academic and special libraries can continue to provide services and resources to researchers who are working on necessarily interdisciplinary research questions within the constraints of organizational structures (universities, libraries, associations, and journals) that can't easily support this work. Over 60 librarians and information professionals from North America, Central America, Europe, Asia, and South Asia attended the conference to discuss this important topic in the context of the twenty papers that were presented.

The IFLA Social Science Libraries Section would like to thank Carol Moore, Judith Dunn, Victoria Owen, the staff and student volunteers from FI for hosting this conference and providing essential material and personal support. Special thanks are also due to Judith Snow and Barbara Ford for bringing together the University of Toronto and the University of Illinois at Urbana-Champaign to work on this project. Additional thanks go to the collaborating organizations, which include The University of Toronto Faculty of Information Science, the University of Toronto Library, University Library of the University of Illinois at Urbana-Champaign, and the Center for Global Studies at the University of Illinois at Urbana-Champaign. We also appreciate financial sup-

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INTRODUCTION

REVOLUTIONS IN SCIENCE AND THE ROLE OF SOCIAL SCIENCE LIBRARIES

Steven W. Witt

> *The moment for grand-scale organizational transformation is approaching* (Wallerstein, 1991)
> *Real problems of society do not come in discipline shaped blocks* (Roy, 1979)

INTRODUCTION:
THE ROLE OF SOCIAL SCIENCE LIBRARIES IN FOSTERING RESEARCH COMMUNITIES

Libraries and information services have always been closely intertwined with the social structures that facilitate research and knowledge production. By their nature, libraries serve broader organizational or cultural missions and thus must in some manner simultaneously reflect the logic of the structures in which they are embedded while anticipating future needs and imperatives. Social science libraries, whether they exist within a strictly academic setting or support research and dissemination in any number of specialized governmental or corporate settings are not exempt from maintaining such a balance. In a non-complex world, where problems remain the same and organizational structures are neither fluid nor permeable, collections, services, and the notion of a user community is straightforward. Knowledge production and the structures of inquiry that social science libraries support, however, are by their nature complex and ever changing.

This complexity is evidenced by the growth of new fields of scholarship and research that libraries and librarians within the social sciences are called upon to support. How does one develop the parameters for building a collection to support Sustainability Research? In what department will one find students and researchers involved in Refugee Studies? How does a librarian effectively disseminate information and data from the multiple fields that conspire to inform Global Studies research?[1]

This continued growth of interdisciplinarity and problem centered research that both challenges and draws upon the strengths of academic structures presents social science libraries with new opportunities to develop structures for collection building, services, and the organization of knowledge that don't simply reinforce or mirror institutional structures as they are currently codified

in the academic world. If libraries and professional practices are truly going to reflect the nature of the knowledge production they support, then one of the areas of increased focus needs to be changes within the paradigms of science and the logic of the paradigms themselves. As Kuhn notes, "one central aspect of any revolution [in science] is that some of the similarity relations change. Objects that were grouped in the same set before are grouped in different ones afterward and vice versa" (Kuhn, 1996, p. 200). In order to remain relevant to the organizations and scholars that libraries support, librarians need to be able to map and anticipate new interdisciplinary or problem focused research communities. This will allow libraries to not only support critical new areas and forms of research but to also challenge the logic of organizational structures and facilitate the paradigmatic shifts central to problem solving and knowledge production.

Through an exploration of interdisciplinarity and transdisciplinarity, this chapter provides suggestions for ways in which social science libraries can better map and anticipate new interdisciplinary or problem focused research communities in order to serve the needs of researchers and aid in dissemination of knowledge to new groups.

DISCIPLINARITY, INTERDISCIPLINARITY, AND COMPLEX PROBLEM SOLVING

Readings on disciplinarity suggest that disciplines focus research within a single paradigm, while paradoxically striving to expand their authority and domain. This complicates the use of disciplines as the unit of analysis for mapping research communities and developing services to support them. These difficulties are made clear through a review of literature on disciplinarity and interdisciplinarty.

Traditionally, science and inquiry within the academic disciplines are focused on small or esoteric problems in order to "investigate some part of nature in detail and depth that would otherwise be unimaginable" (Kuhn, 1996, p. 24). This rationale forms the basis for disciplinary thinking and drives the organization of scientific communities into disciplines. As Kuhn and others note, these structures serve a valuable function in maintaining the preconditions for research, which includes structures to ensure funding, dissemination, and the training of new scholars to continue work within the discipline. Without the shared knowledge, rigor, and avenues that disciplines provide to support and disseminate research, it is impossible to imagine the explosion of knowledge that humans have experienced in the past century.

As organizations, however, disciplines are also inclined to support and serve the social structures from which research communities emerge. This social layer creates an added level of complexity through which the logic of discipli-

nary objectives has the power to supplant the problem that originally informed the discipline. As Salter and Hearn note, disciplines also serve as registers which dictate "the manner in which information is understood, arguments are marshaled, and issues are discussed" (1997, p. 23). These disciplinary registers are characterized by a dominant set of methods or a paradigm; institutional recognition through departments, conferences and journals; a self-identified community; and methods of disciplining community members (Salter and Hearn, 1997).

Others take a more provocative approach to disciplinary behavior and its impact on knowledge production. Gieryn characterizes disciplines as protecting their boundaries from both inside and outside of the academy by expanding their domains of authority, monopolizing knowledge and resources, and protecting its members from external scrutiny (1983). Damrosch uses of the metaphor of free market competition among nation states to depict disciplines in a state of constant competition for ideas, eroding the sense of communities of inquiry and fostering greater divides amongst the disciplines (1995).

Although the disciplines have erected strong mechanisms of control to sustain work in a problem area, scientific inquiry lays the foundation for disciplinary change. Klein attributes this constant state of change to six drivers of permeation:

1. the epistemological structure of a particular discipline
2. relations with neighboring disciplines
3. the pull of powerful or fashionable new tools, methods, concepts, and theories
4. the pull of problem-solving over strictly disciplinary focus
5. the complexifying of disciplinary research
6. redefinitions of what is considered intrinsic and extrinsic to discipline (Klein, 1993, p. 187).

Klein's analysis of the permeation of disciplines highlights the paradoxical role that the disciplines play in creating increasingly miniscule research problems and their accompanying new disciplines while simultaneously fostering more cross-disciplinary exchange through the drawing of new borders to be protected and crossed. The nature of disciplines as described by Klein and others suggests an internal structural weakness that has the potential to inhibit work on complex problems that do not fit within one domain. As Roy notes in his plea to develop permanent interdisciplinary units on campuses dedicated to social problems, "real problems of society do not come in discipline-shaped blocks" (1979, p. 165).

Research on interdisciplinarity focuses largely on knowledge production and organization as it occurs outside of the traditional disciplines. As alluded to by Roy, interdisciplinarity is often seen as the optimal approach for fostering research that draws from the knowledge produced by disciplines to focus upon

societal problems such as climate change, health, and food security. This makes understanding interdisciplinary practices and scholarly communications a key ingredient to learning more about how research problems and communities evolve.

Salter and Hearn (1997) provide a good map of interdisciplinarity as it is practiced and viewed by its practitioners. These are broken down into three forms: an instrumental view of knowledge, new synthesis of knowledge, and critical interdisciplinarity. The *instrumental view of knowledge* is problem centered and responds to external demands. This represents research and structures such as thematic research centers advocated by Roy, which don't challenge existing paradigms and draw upon disciplines for expertise. N*ew synthesis of knowledge* challenges existing structures by developing novel conceptual frameworks and methodologies, leading to a new discipline. C*ritical interdisciplinarity* views both as trapped within the logic of disciplinarity and operating under disciplinary control mechanisms when classifying and categorizing interdisciplinary work.

Woven through these three types of interdisciplinarity is the core of scientific inquiry: problem solving. Much of the research on interdisciplinarity focuses on the role of interdisciplinary research in addressing problems that exist beyond the confines of Kuhn's "Normal Science." Mote's research on the information needs of scientists paves the way for understanding interdisciplinary research as a means to solve complex problems that fall outside the limits of a single subject. Mote identifies three groups of scientists, each working within wider and increasingly variable subject areas, arriving at the third group, through which information must be synthesized from a non-organized literature that relies upon more than one specialist literature (1962, p. 171). Although Mote does not address interdisciplinarity directly, he concludes that these researchers need more informational support and thus require more resources by virtue of their existence outside the disciplinary support structures that sustain the organization of literature and research.

As reported by Klein, research on interdisciplinary and knowledge production later yields conclusions similar to Mote's. Reynolds' three types of problems overlap with Mote's while adding "*problems of the third kind*", which are "generated increasingly by society . . . and [call for] policy-action results [or] a technicological quick fix (Reynolds in Klien, 1999, p.13). These paradigms of interdisciplinarity fall within the traditional social framework of science through which interdisciplinary work is carried out amongst the disciplines.

Gibbons, however, articulates a level of research that is abstracted one level further from what might be seen as traditional interdisciplinarity. Often characterized as transdisciplinarity, Mode 2 knowledge production again mirrors Mote and Reynolds yet adds another layer of complexity by theorizing upon a means of knowledge production that not only focuses on problems driven by social need but also includes the emergence of new non-university/non-

disciplinary actors in identifying problems, finding solutions, and articulating research based policy (Gibbons et al, 1994; 2006). This new research paradigm represents a shift away from disciplinarirty and even interdisciplinarity by breaking down traditional boundaries between science and society and creating new configurations of research and accountability that even moves beyond the university-corporate-government structure (Etkozwitz, 2007).

PROBLEM SOLVING RESEARCH

Research on complex social problems falls within much of what is described as Mode 2 (M2) knowledge production. In the social sciences, the emerging academic area known as Global Studies is an example of scholarly activity that shares many M2 qualities. Global Studies attempts to marshal research, teaching, and even advocacy around global social problems ranging from climate change, human security, sustainable development, and role of the rule of law in governing at a global level. Global Studies often uses the world's population or the phenomena of globalization as a unit of analysis through which to either understand the global dimensions of a problem or determine a means through which a global society is conspiring to develop a solution. Often this is carried out explicitly to inform or advocate for a social outcome or policy position. For example, a topic such as the viability of biofuel production as a replacement for fossil fuels in the context of "global studies" would rely upon the synthesis of knowledge from chemical engineering, agricultural economics, sociology, anthropology, political economics, and area studies. Research methods might combine the use of large data sets for econometric analysis on the real cost of production with deep case studies that document the societal and cultural effects of the displacement of rural economies and traditional food sources. The results of such research might be policy advice on how to best implement technologies taking into account the transnational impact on culture and economies in regions that are seemingly removed from the technical, scientific, problem. Research of this type has all of the hallmarks of the M2 paradigm; Global Studies knowledge discovery is trans-disciplinary, oriented to the solution of an applied problem, distributed across academic and non-academic research communities, and subject to use and analysis by actors from multiple disciplines and organizational settings (Gibbons, 1994).

Given our knowledge of disciplinarity and interdisciplinarity, research of emerging scholarly fields such as Global Studies are of potential merit for examining empirically the organization of communities and knowledge within the M2 framework in order to better understand the broader implications of this kind of research on the library collections, services, and the organization of knowledge.

Problem based research areas such as Global Studies share few qualities with a traditional discipline. These fields of inquiry do not focus on a discrete

or small problem or domain of knowledge, but rather on solutions to problems that encompass other broad domains such as the global population as a whole. There may also be no faculty trained in the area and few structures that yield disciplinary identity or allegiance; journals may be few and degree programs only emergent if existent at all.

As interdisciplinary fields, these problem centered areas would fall within both the instrumental view of knowledge and a critical, transdisciplinary perspective. Research relies upon borrowed methodologies and synthesis from large domains of knowledge. Many also fall into Klien's category of exogenous interdisciplinary knowledge since research problems are created by the real societal problems (1996). This suggests that many of these new areas trend toward the transdisciplinarity that Gibbons attributed to M2 knowledge production.

The methods and disciplines used in any given problem may vary depending on the problem and the way in which the question is framed. Looking at climate change, one may focus on global governance issues that arise from multi-country talks, another may look at global governance from the perspective of the power of civil society to affect policy, and another may focus on variants by which agricultural communities respond to global warming. Each is attempting to answer the question of how humans as a global society respond to climate change.

Research in these domains also tends to be socially distributed. The research community may include multiple institutional, national, and organizational actors that reside within and without the traditional academic based scientific community. This broad network from which to draw and communicate places the mechanisms of control outside of the disciplines and creates the potential for a dynamic system of accountability.

The complexity presented by M2 knowledge production oblige us to re-think how collections are developed and to whom services are focused, requiring new methods of identifying and conceiving users and knowledge organization.

RE-GROUPING PROBLEM BASED DISCIPLINES

The characteristics of transdisciplinary research presents problems in mapping and measuring its research communities. Identifying these communities relies less upon mapping disciplinary structures or institutional practices and more on mapping and exploring the "self-organized ecologies" or "individual constituencies" that emerge around complex problems (Van Raan, 2000; Palmer, 2001). Our knowledge of the difficulties that scholars have in importing and exporting information between scholarly communities also creates a paradoxical situation (Palmer, 2001, p. 125). How does one identify, measure, and analyze an inter/trans-disciplinary group that is not self-identified and operates at an organizational disadvantage? How do libraries justify funds, provide ser-

vices, develop collections, or even identify users in a research community that only exists marginally when viewed through the traditional disciplinary structures? The first step is to map or re-organize research groups to form interdisciplinary or transdisciplinary communities.

Van Raan describes three analytical approaches to studying interdisciplinarity. These include the "research activity profile", which focuses on a group or institute to break activities down into subfields; "the research influence profile", which focuses on works that cite a research group / institute; and "the construction of bibliographic maps", which rely upon co-currance analysis to identify structural relations to expose "*self-organized ecologies"* (2000).

The use of purely bibliometric tools to analyze social connections within research communities points back to Small and Griffith' s work in 1974 to identify academic specialties that constitute disciplinary subfields. Small and Griffith's approach is still employed to cluster research specialties and applicable to learning more about the nature of M2 research.

Schummer's research on patterns of research in nanotechnology, provides various rationales and descriptions of four bibliometric approaches, which include co-currance, co-classification, journal classification analysis, and citation analysis (2003). He concludes that the use of co-author, a type of co-currance analysis, allows one to map geographical, organizational, and disciplinary affiliations to "understand interdisciplinarity as a combined cognitive and social phenomena," which is important in ambiguous fields. Similar uses of co-author analysis are used to identify and visualize M2 research groups (Perianes-Rodriguez et al, 2009).

In each of these instances co-author analysis is used to reveal social linkages among scholars across disciplines, organizations and regions. Although technically different, this method is similar conceptually to Crane's approach to invisible colleges. Like Schummer, Crane uses individual linkages to draw social circles around groups of scholars connected across institutions and to some extent disciplines (1972).

Several articles in the May 2006 issue of *Entrepreneurship Theory and Practice* use co-citation analysis to overcome what is perceived by scholars as fragmentation of this research community and estimate the levels of convergence in research to determine whether the field is evolving into a scholarly discipline (Grégoire et al, 2006; Schildt & Zahra, 2006). This research, however, focuses largely on the use of bibliometrics to measure disciplinarity rather than the social phenomena the surrounds knowledge production around the problem of entrepreneurship.

Schwechheimer and Winterhager analyze the problem areas of climate research and retrograde amnesia in two studies that use keywords to cluster co-cited publications in order to expose new research fronts or "highly dynamic specialties," following directly the work of Small and Griffith yet applying it to M2 problems (1999; 2001).

Heimeriks et al employ an elegant yet complex three tiered approach to studying the network and social dynamics of research areas, such as artificial intelligence and biotechnology, that are "characterized by heterogeneous collaborations between different actors, and by heterogeneous communications using an increasing number of different media." Their methodology begins by building a journal-journal citation matrix based upon a key journal in the area to help represent the nodes, relations, and content within the field of research. Employing co-citation analysis and co-word analysis, content areas, organizational representation, and virtual linkages are then mapped to show how different organizations play the role of users, producers, suppliers and drivers of research in various networks that exist across sectors and countries (2003). This research provides a powerful model to consider, yet relies heavily upon quantitative analysis, missing opportunities to triangulate and deepen their understanding of the social dynamics and motivating factors driving this research.

The range of bibliographic or scientiographic methods employed to graph M2 knowledge production and their social milieu, allows for several routes to explore research on complex social issues. Each of the noted methods, with the exception of Crane, use almost exclusively quantitative methods to expose the social and organizational dynamic of the problems on which they focus. Studies such as these provide a framework from which to begin rationalizing collection strategies, developing bibliographies, or even identifying research communities to which target information dissemination.

CONCLUSION

Continuing to develop our understanding of interdisciplinarity and the manner by which new research communities emerge is the first step in facing the challenges that new and emerging research problems and disciplines pose to libraries and services. As Palmer notes, it is also essential to learn more about how information is used in the context of problem based research (1996). To do this librarians need to insinuate themselves into research communities to gain access to research groups as they emerge and work within these communities to develop the resources, data, and services to support new modes of inquiry and research on complex problems that reside outside of the disciplines.[2] By doing this, "librarians can provide essential boundary services . . . by actively disseminating work across domains and helping to link scientists to others who have complementary expertise." (Palmer, 1996, p. 186).

Providing boundary services embeds librarians into the research process and reinforces the role of librarians as an intermediary of knowledge. It also enables librarians support what Wallerstein characterizes as "a social science that feels comfortable with the uncertainties of transition" (2001, p. 256). In essence,

it positions social science libraries to participate in the process of organizational and structural change rather than reacting to or inhibiting it.

NOTES

1. For research on interdisciplinary collection development and services see: Wilson, M. C., & Edelman, H. (1996). Collection development in an interdisciplinary context. *The Journal of Academic Librarianship*, *22*(3), 195-200; Searing, S. E. (1996). Meeting the Information Needs of Interdisciplinary Scholars: Issues for Administrators of Large University Libraries. *Library Trends*, *45*(2), 315-42; and Dobson, C., Kushkowski, J. D., & Gerhard, K. H. (1996). Collection evaluation for interdisciplinary fields: A comprehensive approach. *The Journal of Academic Librarianship*, *22*(4), 279-284.
2. See chapters throughout this volume on disciplinarity and organizational shifts, data services, and social networks that explore further case studies and analysis of library programs that attempt to these knowledge organization and dissemination needs that social science libraries can address.

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BIOGRAPHICAL STATEMENT

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DISCIPLINARY AND
ORGANIZATIONAL SHIFTS

BEING *UNDISCIPLINED*; OR TRAVERSING DISCIPLINARY CONFIGURATIONS IN SOCIAL SCIENCE AND HUMANITIES DATABASES: CONCEPTUAL CONSIDERATIONS FOR INTERDISCIPLINARITY AND MULTIDISCIPLINARITY

Jean-Pierre V. M. Hérubel

INTRODUCTION AND RATIONALE

Before starting, several important definitions need to be understood, so that one has an awareness and appreciation for how knowledge is created, and published in the social sciences and humanities, and eventually appearing in databases. Knowledge is best characterized as amorphous until it is given form by scholars – in the social sciences and humanities this is accomplished through their respective disciplines, i.e. history, philosophy, political science, etc. The easiest way to demonstrate this is morphologically-the social sciences and humanities constitute domains of knowledge; that is, they are large groupings of phenomena. To make sense and be useful, they are broken up into various groupings called disciplines, i.e. sociology, anthropology, or economics, etc. Courses and research are often based in such disciplines, where information and knowledge generation, valuation, and eventual dissemination occur.[1] The following operative and general propositions offer guidance for this discussion.

Each of these examples has specializations, better known as subdisciplines, i.e. economic history, political history, or the history of science under the discipline of history, ethics, logic, social philosophy, or the philosophy of science under philosophy. All disciplines have subdisciplines, reflecting the nature of specializations in the university. Their different approaches to information and knowledge are fundamentally characteristics derived from consensus-driven protocols, vetted systems of valuation, all grounded with epistemologically acknowledged, accepted and maintained by adherence to disciplinary allegiance.[2] Each disciplinary morphology conforms to such operative approaches to discovery of knowledge and to its dissemination; techniques, perspectives, and execution of research all adhere to and mutually support these disciplinary prerogatives.[3] Knowledge, not a product of each discipline's special fix on domains of knowledge will not constitute verifiable and legitimate knowledge. Each discipline functions as the special preserve, ascribing intellectual worth to knowledge that epistemologically subscribes to these respective disciplinary protocols.[4] For example, sociologists approach their research differently from anthropologists, and historians differ from literary scholars, in how they discover knowledge and in how they write about their findings, which later be-

come published scholarship, the very books, journals, and vetted websites one uses for researching and writing.[5]

To effectively understand the nature of contemporary social sciences and indeed, the nature of why the social sciences have become fluid, one needs to appreciate the nature of disciplinary boundaries and how they are represented in databases. Databases, as either bibliographic utilities, or as full text repositories of vetted information, perforce, conform to our perceptions of what constitutes bone fide disciplines. Often, databases are seen to reflect, mirror-like the true discipline and its representative knowledge, i.e. *America: History and Life*, *Art Bibliographies Modern*, *ArtIndex*, *Anthropology Plus, ComAbstracts, Historical Abstracts, Philosopher's Index, Sociological Abstracts* etc. Each discipline is represented by its own database, upon which disciplinary researchers base their primary search strategies. Even multidisciplinary databases such as *Arts and Humanities Citation Index*, and *Social Sciences Citation Index*, or databases provided by Wilson Indexes, conform to the necessary provision of disciplinary-based indexes to effectively cover the disciplinary topography.[6] To be certain, these database services are incredibly useful and necessary for the provision of information and knowledge emanating from disciplinary activity; however, the need to transcend disciplinary orientation and thinking is required if effective information seeking and appropriation of critical knowledge is to capture emerging research discoveries and other approaches to disciplinary orientations. As knowledge has become more multidisciplinary, and interdisciplinary, databases need to be seen as collection of possible approaches to knowledge that may represent knowledge that may be critical to research, not identifying itself as adhering to a single disciplinary orientation. As research has become more dynamic it crosses various boundaries, especially as it interacts with other forms of knowledge in relation to other disciplines, especially those of the humanities.[7] Where more and more intellectual and epistemological divisions begin to blur, and open disciplinary definitions, such phenomena can be observed in databases.

DISCIPLINARY MORPHOLOGIES AND DEFINITIONS

This approach will rely upon the following general typology for illustration.[8] Disciplines constitute respective morphologies that are animated by consensus, particular perspectives, methodologies and techniques, as well as philosophies that verify knowledge. In actual presentation, the fluidity of definition will be explored as nuance assumes greater visibility in disciplinary databases entertained in this discussion:

Disciplinary Morphology and Typology

Disciplinarity – A highly honed approach with focused objectives, and specific methodological and technical characteristics. Specialized nomenclature and consensus-driven protocols and procedures are maintained.
  Examples – History, Philosophy

Sub-disciplinarity – Highly specialized approach within a disciplinary framework concentrating on specific objectives, utilizing unique methodologies and techniques. Often, a particularistic area of interest is considered within the greater spectrum of a discipline.
  Examples – Environmental History, Philosophy of Science

Multidisciplinarity – Several disciplines involved, providing their unique perspectives without actually melding. Disciplines come together to explore phenomena and work on stated objectives, while retaining their singular characteristics.
  Examples – African Studies, American Studies

Interdisciplinarity – Two or more disciplines actively engaged, synthesizing their efforts within a given range of objectives and conditions. Techniques and methodologies mesh and meld in order to accomplish objectives.
  Examples – Bioethics, Ethnic Studies

Trans-disciplinarity – Disciplines focused upon objectives, become comprehensively melded within a higher conceptual perspective. This demands a nearly seamless integration of former disciplinary characteristics.
  Examples – meta-criticism

Illustrations Using Social Science and Humanities Databases

As illustration, examples of fluidity of disciplinarities offer additional permutations which permit one to begin thinking across various disciplinary orientations, where knowledge and its construction affects the approach taken to understanding the fluidity of disciplinary borders and their particular approach to knowledge generation and its distribution within scholarly communication. Such examples will treat art and design, communication, as well as philosophical pursuits within a social science perspective, i.e. art market, art journalism, politics and media, or bioethics, etc. by using subjects as they are appearing in social science and humanities databases.

  Discipline: When an area of human phenomena is demarcated and conforms to rules of consensus governing, methods, approaches, and techniques. Generally, individuals engaged in disciplinary activity conform to the discipline's culture of viewing information and knowledge as agrees to general principles characterizing a discipline, i.e. history, political science, or sociology.
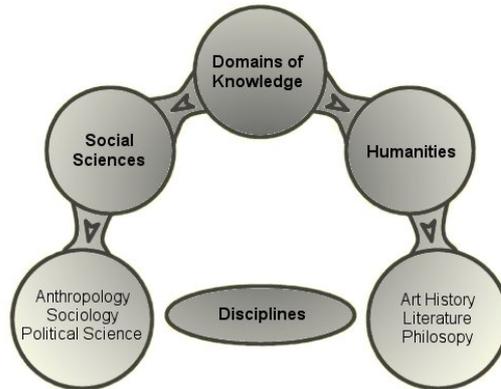
As the researcher pursues research objectives, he soon discovers articles, books, and websites are with the specialized reader in mind. The language and the nomenclature, i.e. specialized vocabulary reflects the nature of the disci-pline being read.[9] Sociology, anthropology, political science, or philosophy, possess their own sets of vocabulary and communication habits and traditions. Specialists from sociology, economics, or history, or philosophy may be ad-dressing the same topic, and read and sound so differently. They may speak and write the way they do as they conform to their respective disciplines, even as they may be dealing with the very same set of research problems.

Different Kinds of Scholarly Activities

Subdisciplinary: When a discipline has a highly specialized approach and methods for examining specific areas of interest, i.e. economic history.
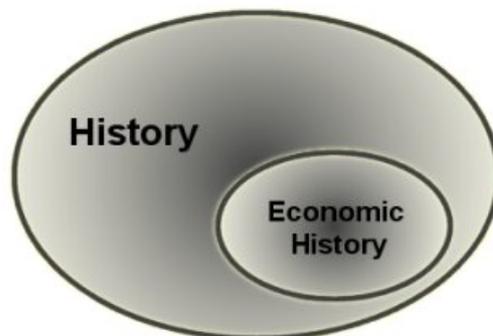
Interdisciplinary: When two disciplines or more come to together to examine a topic or set of topics and meld into a permanent relationship, i.e. history and philosophy of science or political communication.
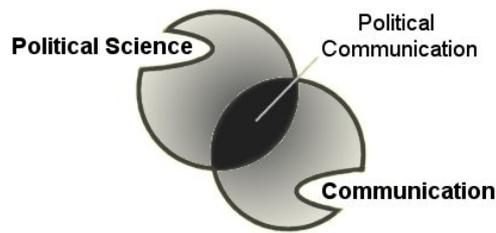
Multidisciplinary: When several disciplines come to together to share approaches and methodologies on a specific topic, or set of topics, from different disciplinary perspectives without ever becoming permanently involved, i.e. national health care policy or international news flow.
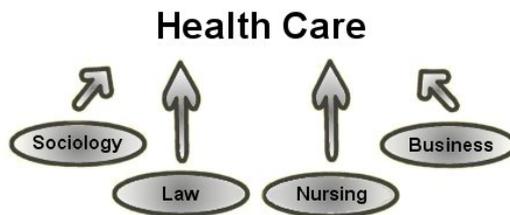
Complexity of Information and Knowledge

As the nature of knowledge becomes more and more complex, so do the ways in which we attempt to understand human phenomena. Often, it is simply very difficult to perform necessary research without considering interdisciplinary and multidisciplinary approaches to successfully conduct research. Whether the researcher is studying political communication and presidential elections or politics, or trying to explore symbolism in film and social history in Latin America, casting one's research net beyond the familiar database to discover and examine different materials from different disciplines, may prove critical.[10] Sophisticated, if not nuanced consultation of different disciplinary databases, addresses the need to think beyond comfortable disciplinary affiliations to capture the breadth of possible phenomena pertinent to the researchers' interests. As the researcher pursues databases the use of disciplinarily-oriented databases, i.e. *ArtIndex*, *Anthropology Plus*, *ComAbstracts*, *Historical Abstracts*, or *Philosopher's Index* should be judiciously complemented by other pertinent databases. This requires both librarians and users to go beyond their zone of intellectual comfort and move into the intellectual configurations of knowledge contained and identified via other disciplinary nomenclature.

As illustration, to effectively pursue the rise of the newspaper in 19th century America, one may have to consult reference tools that lead to specialized jour-

nal articles and monographs in political science, journalism history, American Studies, economics, media studies, United States history, and even literary studies, among other possibilities. The newspaper is so crucial to American cultural practice and life that many different disciplines could be consulted for their valuable perspectives, insights, methodological and technical tools. This approach could entail a very multidisciplinary activity looking like this:

19th Century Newspapers

English   History   Art History   Economics
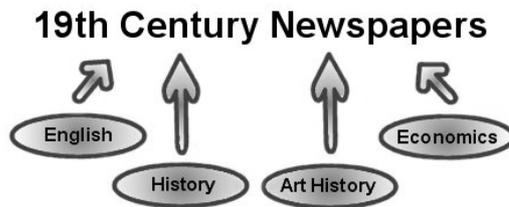
II. ART OR AESTHETIC RESEARCH

Art is perhaps as old as humankind and accompanied human beings as they have evolved through time and many cultures. The systematic study of art is less old and has developed particular characteristics that form art appreciation or art history proper. Multifaceted and complex, the fine arts lie within the humanities:

Humanities

Arts & Music   Philosophy

Literature   History

Religious Studies
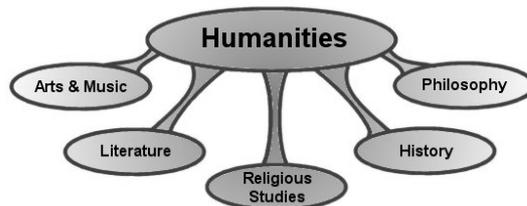
Depending on how art and aesthetics mingle with other areas of life and human activity, art can merge with other disciplines and bodies of knowledge, without which nuances and deeper and richer comprehension would not arise. Using other disciplinary knowledge intersects with art and aesthetic phenomena as societal, historical, political, economic, or communication aspects require elucidation.[11] Research requiring studies of economic cycles in art production, sociological conditions of the art market, and/or perception studies of aesthetics genres, requires other approaches to examination found in *ArtIndex*. The following examples of disciplinary alliances, opens the research field:
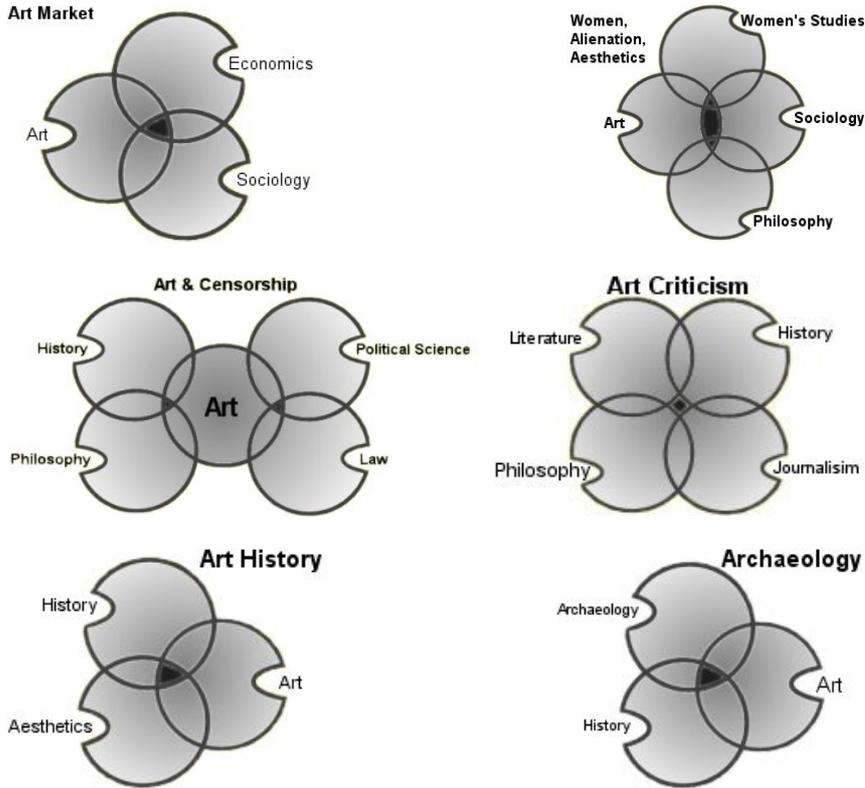
The following are examples of using databases in tandem with *ArtIndex* for various subjects requiring deeper and richer analyses:
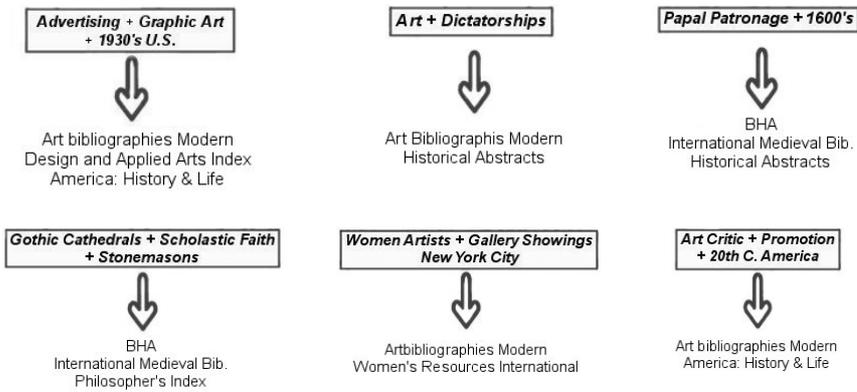
III. Communication and Media Studies Research

Communications is a very broad field covering many different disciplines and methodologies. Communications and media studies reflect both the social sciences and the humanities:
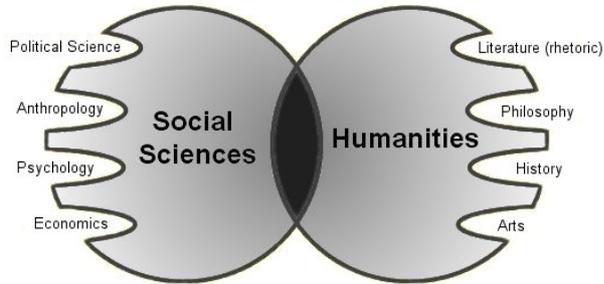
Since human communication is so complex, there are many approaches to research in communication and media research. Communication and media studies cover many specialties: advertising, mass communication, journalism, public relations, organizational communication, inter-personal communication, among others. One single database, no matter how deep and comprehensive in nature, can offer the possible approaches derived from other disciplinary approaches that may enhance communication and media studies.[11]

Databases covering such disciplines as history, political science, economics, psychology, modern languages, as well as others may index useful articles, conference papers, and monographs critical to a thorough research objective. Communication *is* an interdisciplinary field that crosses many disciplines. Thinking in terms that allow for latitude may garner greater and effective knowledge, necessarily reflecting perspectives, methodologies, and insights generated by other disciplinary orientations.

The following are examples of using databases in tandem with *ComAbtracts*:

Environmentalism and Presidential Rhetoric ⇩	**Patient/Physician Dialogue** ⇩
PAIS International, Newsbank, Lexis-Nexis Academic Universe, MLA Bibliography, Philosophers's Index	Medline, Sociofile, PsycINFO
Mother/Daughter Discourse ⇩	**News Reporting and Agenda Setting** ⇩
SocioFile, PsycINFO, Women's Resources International	PAIS Internation, Lexis-Nexis Academic Universe
Differences and Self Image ⇩	**World War I or World War II and Propaganda** ⇩
SocioFile, PsycINFO Women's Resources International	American History and Life Historical Abstracts, FRANCIS
Rhetoric and Political Theory ⇩	**International Public Relations** ⇩
MLA Bibliography, Philosopher's Index	Business Source Premier, PAIS International

Depending upon the complexity of subject pursued, using several databases, and exploring subjects across various disciplines, may be key to viable and more enriched research. Even if materials are appearing in journals not identified as Communication or Media Studies, they may still offer critical insight, useful techniques, or philosophical perspectives heretofore, unknown or previously seen as irrelevant. Another discipline's particular methodologies and approaches can stimulate and even affect a research agenda, laying open unexamined research questions. These are equally valid, especially if empirical results are relevant, and not available through traditional communication literature.

IV. Philosophy or Philosophical Research

As the oldest of human intellectual pursuits, philosophy is devoted to examining fundamental questions that may reflect nearly everything – as everything can be philosophically examined.

Primary Branches of Philosophy:

Aesthetics   Epistemology

Metaphysics

Philosophy of Language   Ethics

Logic
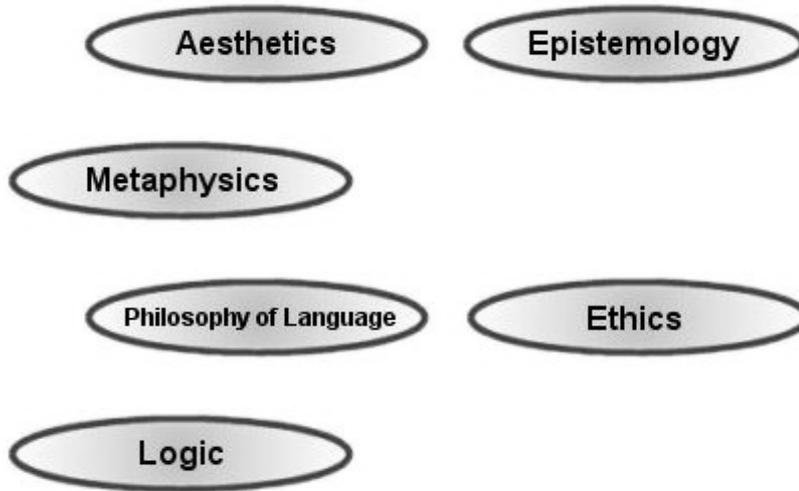
Within these basic branches, specializations such as bioethics, cosmology, or ontology are found.[12] Philosophy is extremely fluid in how it can shed light on other disciplines and their respective topics of interest. Firstly, it is firmly placed in the humanities:

Humanities

Arts & Music   Philosophy

Literature   History

Religious
Studies
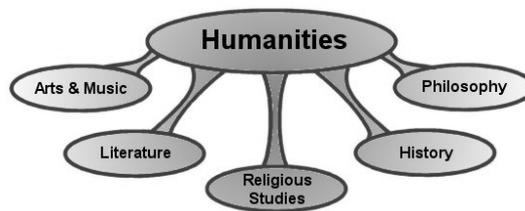
Secondly, it interacts critically with other disciplines in both the humanities and the social sciences, and with the natural sciences, depending upon subject pursued:
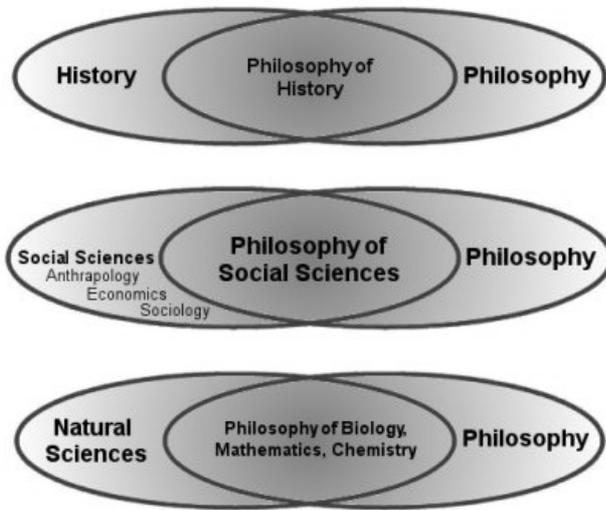
As one of the humanities, philosophy examines all human and natural phenomena; indeed, all is capable of falling under philosophical examination. Since philosophy perforce examines everything, it accedes to strict and carefully honed perspectives, methodological rigor, and executed techniques of analysis. Philosophers and researchers searching for philosophical literature normally use *Philosopher's Index*- the most comprehensive index devoted to philosophy. International and multilingual, it covers publications from 1940 to the present. It includes books and articles with abstracts for all specialties – aesthetics, epistemology, ethics (pure & applied), history of philosophy, logic, metaphysics, philosophy of mind, social & political philosophy, as well as schools of thought, i.e. analytical, continental, feminism, postmodern, subspecialties, such as philosophy of science, law, language, or medicine. Although the philosophical researcher naturally gravitate toward the *Philosopher's Index*, searching across disciplines requires both *Philosopher's Index* and other databases to effectively locate pertinent knowledge vetted by other disciplinary orientations.

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┌────────────────────────┐            ┌──────────────────────┐
│  Heidegger &technology │            │  Aristotle & sciences│
└────────────────────────┘            └──────────────────────┘
            ⇓                                     ⇓
    ╭───────────────────╮              ╭───────────────────╮
    │  M.L.A. Bibliography│             │  M.L.A. Bibliography│
    │  Humanities Index  │              │  L'Année Philologique│
    ╰───────────────────╯              ╰───────────────────╯

              ┌──────────────────────┐
              │     Foucault & body  │
              │  & scientific discourse│
              └──────────────────────┘
                        ⇓
                ╭───────────────────╮
                │      SocioFile    │
                │  M.L.A. Bibliography│
                ╰───────────────────╯
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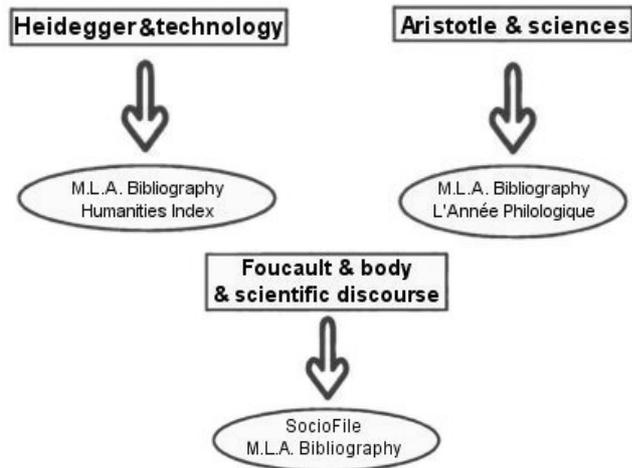
Often subjects transcend disciplinary affiliations requiring interdisciplinary or multidisciplinary consultation of databases that may also reflect philosophical scholarship. This is especially critical with subjects concentrating on such topics as applied ethics, bioethics, political, social philosophy, or philosophy and history of science.[13]

CONCLUDING OBSERVATIONS

Databases perforce reflect the stated protocols and disciplinary nature of the disciplines they represent. Their intellectual construction addresses the needs and objectives of bibliographic services aligned to disciplinary acculturation and disciplinary prerogatives; yet, knowledge is not created within a vacuum, nor is it housed within prescribed and humanly demarcated bibliographic utilities. Although the veracity of disciplinarily-constructed and oriented databases is not at question, their singular use by researchers should be complemented by the incorporation of other databases, at least those within the intellectual constellations of respective domains of knowledge, i.e. humanities and social sciences. These introductory observations relating to disciplinary formation, and attendant disciplinary databases address the growing mingling of disciplinary knowledge that moves beyond the confines of disciplinary alignments. Indeed, as more and more disciplines become fluid, so too will the need to traverse their respective databases, assume a larger complementary role in information seeking.

NOTES

1 For a discussion of disciplinary morphologies and disciplinary definitional concerns, consult Hérubel, Jean-Pierre V. M., "Musings on Disciplinary Morphology and Nomenclature in the Humanities and Social Sciences: Implications for Book Selection." *Journal of Scholarly Publishing* 39 (October 2007): 318-326

2 See Becher, Tony. (1989). *Academic Tribes and Territories: Intellectual Enquiry and the Cultures of the Disciplines*. Bury St. Edmunds, Eng.: Society for Research into Higher Education, Open University Press.

3 For more insight, consult Biglan, Anthony**.** 1973. "The Characteristics of Subject Matter in Different Academic Areas." *Journal of Applied Psychology* 58:195–203; Becher, Tony. (1994). "The Significance of Disciplinary Differences," *Studies in Higher Education* 19(2), 333–346; Light, Dondald Jr. 1974. "Introduction: The Structure of the Academic Professions." *Sociology of Education* 47 (Winter):2–28.

4 For useful discussions of disciplinarity, see Chapter 1 of this volume, and Klein, Julie Thompson. *Interdisciplinarity: History,Theory, and Practice*. Detroit: Wayne State University Press, 1990; Klein, Julie Thompson. *Crossing Boundaries: Knowledge, Disciplinarities, and Interdisciplinarities*. Charlottesville, Va.: University Press of Virginia, 1996; Messer-Davidow, Ellen, David R. Shumway, David J. Sylvan, eds. Knowledges: Historical and critical Studies in Disciplinarity. Charlottesville: University Press of Virginia, 1993; Finkenthal, Michael. *Interdisciplinarity: Toward the Definition of a Metadiscipline?* New York: P. Lang, 2001.

5 For varied discussions to writing and publishing consult, Kipling, Kim J., Murphy, Richard J. Jr. *Symbiosis: Writing and an Academic Culture*. Portsmouth, NH: Boynton/Cook Publishers, 1992; Wildavsky, Aaron. *Craftways: On the Organization of Scholarly Work*. New Brunswick, N. J.: Transaction Publishers, 1993; MacDonald, Susan Peck. *Professional Academic Writing in the Humanities and Social Sciences*. Carbondale and Edwardsville: Southern Illinois University Press, 1994; Kjersti Fløttum, Trine Dahl, Torodd Kinn. *Academic Voices: Across Languages and Disciplines*. Amsterdam; Philadelphia: J. Benjamins Pub. Co., 2006.

6 Perusal of reference guides to disciplinary literatures, often offer listings of available databases per disciplinary orientation. Occasionally, they offer titles that may bridge other disciplines.

7 For a fascinating discussion of boundary work, and the intersections of creativity appearing at the edges of disciplines, see Dogan, Mattei, Robert Pahre. *Creative Marginality: Innovation at the Intersections of Social Sciences*. Boulder: Westview Press, 1990; Dogan, Mattei. "The Hybridization of Social Science Knowledge." *Library Trends* 45 (Fall 1996): 296-314.

8   See Hérubel, Jean-Pierre V. M., "Musings on Disciplinary Morphology and
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     321.

9   See Becher, Tony. "Disciplinary Discourse." *Studies in Higher Education*
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     plines: The Case of Ethnological Science." *Technical Communication
     Quarterly* 13 (Autumn 2004): 393-421; Kruse, Otto: "The Origins of Writ-
     ing in the Disciplines: Traditions of Seminar Writing and the Humboldtian
     Ideal of the Research University" *Written Communication* 23 (July 2006):
     331-52.

10   For discussions disciplinary and interdisciplinary scholarship in selected
     and social sciences, see Buchanan, Anne L. and Jean-Pierre V.M. Hérubel,
     "Tracing Interdisciplinarity in Contemporary Historiography Using *SSCI*:
     The Case of Toynbee, McNeil, and Braudel." *Collection Building* 13 (Fall
     1993): 1-5; Buchanan, Anne L. and Jean-Pierre V.M. Hérubel, "Using
     SSCI to Map Scholarly Influence in the Social Sciences:Braudel and An-
     nales Historiography." *Behavioral & Social Science Librarian* 12 (1993):
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     ture* 29 (Spring 1994): 205-209; Hérubel, Jean-Pierre V.M. and Anne L.
     Buchanan, "Disciplinary, Interdisciplinary, and Subdisciplinary Linkages
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     ity in Historical Studies: Citation Analysis of the *Journal of Interdiscipli-
     nary History*." *Libris: Library and Information Science Research Elec-
     tronic Journal* 4 (1994): 1-13; Hérubel, Jean-Pierre V. M. and Anne L. Bu-
     chanan, "Jean-Jacques Rousseau Among the Footnotes: Mapping Interdis-
     ciplinary Research in *Social Sciences Citation Index*." *Behavioral & Social
     Sciences Librarian* 13 (1994): 49-57; Buchanan, Anne L. and Jean-Pierre
     V. M. Hérubel, "Interdisciplinarity: The Case of Historical Geography
     Through Citation Analysis." *Collection Building* 14 (1994): 15-21; Goede-
     ken, Edward A. and Jean-Pierre V. M. Hérubel, "Periodical Dispersion in
     American: History: Observations on Article Bibliographies from the *Jour-
     nal of American History* ." *The Serials Librarian* 27 (1995): 59-74; Héru-
     bel, Jean-Pierre V. M. and Edward A. Goedeken, "Using the *Arts and Hu-
     manities Citation Index* to Identify a Community of Interdisciplinary Histo-
     rians: An Exploratory Bibliometric Study." *The Serials Librarian* 41
     (2001): 85-98.

11   For discussions of interdisciplinary and multidisciplinary orientations in
     contemporary art history, see Korenic, L. (1997). Inside the discipline, out-
     side the paradigm: Keeping track of the new art history. *Art Libraries
     Journal, 22*, 12-18; ; Dowell, E. (1999). Interdisciplinarity and new meth-

odologies in art history: A citation analysis. *Art Documentation*, *18*, 14-19; Hérubel, Jean-Pierre V. M., "Art History Dissertation Trends as a Selection Approach for Art History Collections." *Indiana Libraries* 26 (2007): 40-43.

12 See Block, Eleanor S., James K. Bracken. *Communication and the Mass Media: A Guide to the Reference*. Literature Englewood, Colo.: Libraries Unlimited, 1991; Tyler, David C., Signe O. Boudreau, Susan M. Leach. The Communication Studies Researcher and the Communication Studies Indexes. *Behavioral & Social Sciences Librarian* 23 (2005): 19-46.

13 For discussion of philosophy as discipline and as scholarly activity, consult Bynagle, Hans E. *Philosophy: a Guide to the Reference Literature*. Englewood, Colo.: Libraries Unlimited, 1997; Blazek, Ron, Elizabeth Aversa. *The Humanities: A Selective Guide to Information Sources*. Englewood, Colo.: Libraries Unlimited, 2000; for examples of interdisciplinary work, consult, Glendinning, Simon. *The Edinburgh Encyclopedia of Continental Philosophy*. Edinburgh: University Press, 1999; Post, Stephen Garrard. *Encyclopedia of Bioethics*. New York: Macmillan Reference, 2004, or Chadwick, Ruth F. *The Concise Encyclopedia of the Ethics of New Technologies*. San Diego, Calif: Academic Press, 2001. Top of Form.

14 See Hérubel, Jean-Pierre V. M., "Clio's View of the History of Science: A Preliminary Bibliometric Appreciation." *Behavioral & Social Sciences Librarian* 24 (2006): 69-91.

BIOGRAPHICAL STATEMENT

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DISCIPLINARY BOUNDARIES
IN AN INTERDISCIPLINARY WORLD

Margaret Robb

INTRODUCTION

Interdisciplinary studies are being encouraged and supported across many academic and governmental institutions. At the University of Oxford, topics such as AIDS, INTERNET studies, criminology, climate change and other environmental issues are being addressed by academics from a wide range of disciplines. Research centers and specially funded projects are being set up to provide the infrastructure to support interdisciplinary studies. Current technological advances facilitate working across disciplinary boundaries. Search engines and web tools encourage seamlessness.

Research today is all about expanding disciplinary boundaries. The stress on interdisciplinary collaboration brings challenges to librarians. The nature of enquiries change when our readers have different agendas. The READER SERVICES LIBRARIAN has to know how to find materials across a wide variety of disciplines. The "Politics Librarian" has to know about data and the "Economics Librarian" has to know about mapping and climate change

This paper will begin with a whirlwind definition of "an academic discipline" before considering what is currently meant by interdisciplinary research and teaching in the social sciences. I will argue that disciplinary boundaries do continue to exist and do play a vital role in the quality of interdisciplinary studies. I will present my case through a series of illustrations based on academic writings, administrative documents, library surveys and discussions that took place in a series of Research Fora instigated by the University of Oxford's Vice-Chancellor, John Hood, in 2006, on topics of national and international significance. The aim of these Fora was to increase the awareness and appreciation of the research strengths in the different divisions and the potential for inter-disciplinary research.

Once we have defined and described what is meant by inter-disciplinary research in the social sciences, we then need to consider how librarians and information specialists might best support interdisciplinary research. The ACRL's Environmental Scan (ACRL, 2007) notes:

- Interdisciplinary studies...and newly developed areas of inquiry will stretch library resources and service models.
- The focus for academic libraries will shift from the creation and management of large, on-site library collections to the design and delivery of library services.

PART I: DEFINING THE DISCIPLINES

Between 1613 and 1619, the University of Oxford constructed a two-storey quadrangle around Duke Humphrey's Library (now the Bodleian) to provide space for the delivery of lectures. Each discipline taught in the University was clearly denoted by an inscription over a doorway in the quadrangle, i.e. *Schola Moralis Philosophiae* (School of Moral Philosophy), *Schola Musicae, Scola Naturalis Philosophiae, Schola Grammaticae et Historiae, Schola Linguarum (Hebraicae et Graecae), Schola Geometricae et Arithmeticae, Schola Metaphysicae, Schola Logicae, Schola Astronomiae et Rhetoricae, Schola Vetus Medicinae, Schola Vetus Jurisprudentiae.* These original disciplines were the accumulated wisdom of people who had studied a subject. The discipline existed as a framework within which you could expand your thinking.

Secularization of the classical curriculum in the late 19th century and the creation of new disciplines in the 20th century greatly expanded the number of disciplines that could be studied. An academic working party considering the role of interdisciplinary activities in college life concluded "that subjects and disciplines inherited from the 19th century are evolving: interdisciplinarity works best when grounded in strong disciplinary collaborations" (Linacre College, 2008).

Some of the 20th century disciplines were created as a product, packaged for consumption in the preparation for certain careers and professions, such as social work or teaching. There was also a growth in new disciplines that focused on specific themes, such as refugee studies, environmental studies, media studies and women's studies. The teaching and research associated with these new disciplines were by nature "interdisciplinary" because they brought together academics from different disciplines. Each academic brought their own disciplinary approach to the same topic. The "discipline" became a way of thinking or a way of approaching a particular problem. It was no longer defined simply by the knowledge of a subject.

In Oxford, in the year 2000, five academic divisions were created to group together related departments, faculties and research centers. As of 2008, the Social Sciences Division included Anthropology, Archaeology, Geography and Environmental Science, Development Studies, Economics, Education, Internet Studies, Law, Management Studies, Politics & International Relations, Social Policy & Social Work, and Sociology. Interdisciplinary work is, of course, strongly encouraged.

The Division also includes the School of Interdisciplinary Area Studies which is devoted to understanding "the complexity and the interrelatedness of society through anthropology, economics, politics, history, sociology and culture." The associated units are defined by geographical or political links. In the Social Sciences, Oxford has Research Centers devoted to African Studies, Latin American Studies (including Brazilian Studies and Mexican Studies),

Japanese Studies, Contemporary China Studies, Russian and East European Studies, and Contemporary Indian Studies.

PART II: WHAT IS INTERDISCIPLINARY E.G. RESEARCH AND TEACHING AND HOW MIGHT LIBRARIES PLAY A SUPPORTIVE ROLE?

During a conversation with a former Head of the Social Sciences Division, Donald Hay, he postulated that no one does real interdisciplinary research because they are too involved in their own discipline. The interdisciplinary research centers in the Division involve academics from different disciplines looking at the same problem, for example, forced migration. But if each academic sticks firmly to their disciplinary perspective, are they really producing interdisciplinary work? Surely it is the accommodation of several approaches that will produce truly interdisciplinary research (Hay & Robb, 2008)? Do we have to wait for the return of a Renaissance man (or woman), such as Thomas Linacre (c. 1460 – 1524) who was both a humanist as well as a physician?

The following illustrations will give different views of what is meant today by interdisciplinary research and how librarians might organise themselves to support this type of research.

Illustration 1

A Research Forum on Forced Migration (Vice-Chancellor, 2008, 4 March) included anthropologists, lawyers, political scientists and economists. Each speaker approached the issue from their disciplinary perspective. The lawyer looked at issues from a human-rights perspective, the anthropologist was interested in what "community" means to displaced migrants, the political scientists explored the historical context of "banishment" and an economist discussed how the Prisoner's Dilemma was used to explore the possibilities for cooperation between "north" and "south". This strict disciplinary approach heightened our awareness and appreciation of the contributions that were being made to the same issue.

However, it was a talk by Jason Hart, an anthropologist, that demonstrated the significance of a more deeply interdisciplinary approach in understanding and explaining the problems faced by Palestinian refugees in Jordan. He argued that, without knowledge of the history, the socio-economic situation, the ethnographic, legal and political work associated with the situation, he could not have done his work. His study incorporated an examination of familial relationships and the generational reaction to refugee status (anthropology), the effect of space and crowding (geography), the destruction of the ability to imagine a community (psychology), the socio-economic situation facing each generation (economics) and the role played by countries (international relations).

How can libraries support this style of interdisciplinary research?

By creating a library centered on a topic which collects everything and anything associated with that topic. For example, the Oxford University Refugee Studies Library houses the largest collection of materials worldwide relating to the causes, experiences, consequences and implications of forced displacement, whether development-induced or disaster-induced (Rhodes). It has books and journals on the topic but more invaluable is its extensive collection of grey literature which is gradually being digitised so it is available in the field to academics, researchers and students, policy makers, service agencies, the general public and refugees themselves. This encourages interdisciplinary research by its focus on a topic, rather than on individual disciplines. Knowing the increasing importance of obtaining information on the web, many libraries have digitisation projects, particularly as a way of making special collections more visible to the research community.

Illustration 2

Interdisciplinary research based on "a central distinguishing theme" was explored in the Vice Chancellor's Research Forum on Global Health (2008, 20 May). Though the medical doctor, psychiatrist, demographer, philosopher and political scientist spoke about their work individually, it was clear that the success of their work was based on integrating the contributions from different disciplines. The strength of each discipline fed into finding solutions to the complex problems associated with solving global health problems.

   For example, there are ethical issues associated with managing health data and the design of consent forms. Demography is crucial to understanding the effectiveness of vaccines, and engineers (who understand the medical problem) have designed tools that are solving health problems in countries lacking infrastructure. Criminologists are involved in examining global health corruption, such as the production and marketing of counterfeit drugs. Twenty-five years ago the medical scientists "got on with the science" but now, policy issues are crucial to the implementation of a medical solution. Social scientists are needed to help create and implement the policies that will support global health solutions. The Forum provided a good example of where an equal partnership "with a mutually intelligible language of communication, agreed objectives and equal inputs" (Pollard & Bray, p. 2) could lead.

How can libraries support this style of interdisciplinary research?

The key here is in providing a "language" that can be understood by the very different communities. Librarians spend much time selecting subject headings (e.g. LC, MESH) and database suppliers create thesauri to group together items on a similar topic.

Resource discovery software, such as ExLibris' Primo, offers readers even more opportunities to expand their knowledge of related items. Faceted classification is ideal for an online world in which multiple navigational paths might be assigned to a single item. There is no longer the same constraint as one has with a class mark which determined a book's single location on a shelf. However, faceted systems do require a decision about which facets will be applied and displayed in the database. Another development that will encourage interdisciplinary exploration is the option for library users to "tag" an item with their own terminology. This encourages our readers to share their own knowledge about a book or online resource with each other. Tagging is a way of expanding on the subject headings assigned by cataloguers who will not know a subject as well as a specialist researcher. The assignment of authoritative subject headings will group together materials while tagging, and faceted searching will expand the links between items. Both are necessary to the support of interdisciplinary research.

Illustration 3

In 2006, Oxford University founded the Extra-Legal Governance Institute (EXLEGI). It is the study of governance where state protection is ineffective or absent. Examples of such groups include the Mafia and Al-Qaeda. It is an interdisciplinary institute founded by sociologists and an economist with links to the Law Faculty. One of the founders, Federico Varese, began a seminar by noting that "disciplines are a smokescreen – you need to approach your research by topic". When they set up their center they were very keen on having the Library of Congress create a new subject heading in support of the concept of "extra-legal governance". The Social Science Library cataloguer has been working with the Center to find evidence of the significance of this topic so that permission will be granted to create a Library of Congress Subject Heading for this area of research. The inclusion of this term in the Library of Congress's Authority Files was seen by the academics as an important marker for defining this as a recognised research topic that would then be used to group together resources.

How can librarians support this style of interdisciplinary research?

First, by keeping up-to-date with new areas of research by attending seminars, talking with members of new research centers, checking faculty web-sites to see how academics describe their areas of research, etc.

Secondly, we can inform researchers of library holdings with new book displays, RSS feeds of new acquisitions, email alerts of a new e-resource, etc. However, these are usually discipline-based. How might these be more interdisciplinary? The Oxford University Library Services began by developing a long list of subject and geographical area codes to mirror the University's

curriculum and academic departments. Each new acquisition is assigned a code. This makes it possible to create accessions lists automatically on "South East Asia" or on "Politics" or on "Refugee Studies". The codes bring together onto a single list the items purchased by any of the thirty-nine University libraries so the researcher is better informed about relevant holdings in all libraries. A pivot table in Excel also allows lists to be created dynamically, e.g. "all items in French published in Africa on Politics and Health Care". This process allows us to create accessions lists that are interdisciplinary and relevant to research topics.

Finally, an old-fashioned library guide listing bibliographic databases with materials on a topic will inform academics from different disciplines about e-resources they might not normally use. A guide listing Library of Congress classification numbers that are relevant to a topic can also be invaluable for researchers just used to "their part of the library". And of course, we should put the guide online so that it can be found via a search engine.

Illustration 4

In the United Kingdom, the distribution of research funding between Universities has been based on the results of a "Research Assessment Exercise" that used peer-review panels made up of academics to determine the quality of research for each department in each University. The Funding Councils are now considering a bibliometric model to replace the current system. Literature on the topic indicates that using bibliometric indicators (such as those provided by Web of Science or SCOPUS) will provide a dis-incentive to interdisciplinary research. This is largely because current citation measures are discipline-based. What happens to disciplines that are less reliant on journal publications? While the government and the research funding bodies encourage interdisciplinary research, the means by which funding is actually allocated will be based on a system that rewards discipline-specific research (Donovan & Butler).

How can libraries help promote interdisciplinary research in a world where discipline-based citation counts skew the picture?

Institutional Repositories are being seen as a way of promoting an institution's research, as a means of preserving research and "guaranteeing access to future 'vernacular' versions of documents" (Hoorens & Rothenberg, p. 2). The "Oxford University Research Archive" offers searching options that allow for departmental, disciplinary and cross-disciplinary searching. The Social Science Library is involved in a European Union project which is aiming to create a subject-specific repository. Economists Online will include the holdings of RePC as well as the publications of the economists associated with selected Universities across Europe. The Project Manager points out that " … it is vital

to address the diversity between disciplines and their needs, realising that there is no 'one size fits all' solution for incentives to deposit material. Bio-chemists, economists, physicists, geographers, historians all follow different research work processes, the way they organise their research and their networks differ, and the way they disseminate that output varies. These aspects need to be considered when creating advocacy programmes, designing deposit or end user information retrieval service interfaces..." (Proudman).

Illustration 5

The creation of a new Management course in the Social Sciences Division offered the opportunity for an interesting discussion about the challenges presented by a cross-disciplinary course. The course proposal noted that many of the students entering such an interdisciplinary course will be expected to move away from their original domain of expertise while appreciating how management research is embedded in the social sciences and in policy and practice. This would be achieved by "providing courses that cover a wide range of practical topics, with each being covered in depth and with critical engagement. The cross-linking platforms of managing performance, globalisation, risk management and research methods will provide opportunities for students to appreciate the similarities and differences between the models that underpin these topics, while placing them within the context of the social sciences…Students must acquire an awareness of the contrasting epistemological perspectives on management, enabling them to move beyond their original parent discipline…Trans-disciplinary research employs a mixture of theories and techniques from more than one discipline. Students will be encouraged to experience directly the difference of approach that different specialties and epistemological models can bring to solving a problem" (University of Oxford, p. 95-96).

How can libraries support this style of interdisciplinary research?

Librarians must be involved in contributing to the development and the teaching of the methodology courses that are a requirement for all post-graduate students. Information skill training should include an explanation of the difference between browsing and searching, between using a title or a subject index, between a bibliographic database and a full-text e-journal package, and between using a thesaurus and an index. We should give tips on locating quality resources on the Internet and explain how to make the most of searching Google. We should work with the academics in detecting plagiarism and work with the students to help them understand what is meant by plagiarism.

The Social Science Librarian-in-Charge, Louise Clarke, is working with academics across different departments to provide a joined-up programme of search clinics. Masters students preparing their thesis will be able to select the

workshops that best match their thesis topics, though these might fall outside the resources traditionally associated with their discipline. For example, a student researching their thesis topic for the Evidence-Based Social Policy course might need to use Criminology or Health Care resources. They would be able to attend a search clinic covering these information resources.

Illustration 6

One of the changes we have noticed across the social sciences is the growing use of data by all social scientists. For example, over the past three years, Oxford's Social Sciences Subject Consultant has noticed that the percentage of enquiries from researchers, academics and post-graduates related to the discovery and access of data has increased. As a result of this increase, a Data Survey was conducted in 2007 across the Social Sciences Division. It showed that "a high percentage of respondents (78.5%) are collecting and using their own data for research, with an almost equal percentage (77.8%) using existing data" (Janes, 2007). The survey also showed that Google, known websites and journal articles were the most common means of locating data. This worried us because Google "does not yet include sufficient information about the content of data archives or the many commercial data resources that we subscribe to and this leads to confusion about what is available. There is also some inconsistency in the way that numerical data sources are handled by the Google engine" (Janes, 2007, July).

What can libraries do to help the social scientist looking for data?

The Universities of Harvard and Yale separately developed data catalogues in an effort to increase the visibility of their data resources. The London School of Economics has a web page devoted to the location and use of data. The Oxford Social Science Library (after trying many other solutions) decided to use Google Custom Search to offer enhanced searching of data resources. The Survey showed that researchers are going to Google, so shouldn't we use Google to help them improve their search results? Mark Janes has now added 1,200 sites that contain statistical data using Google Custom Search (http://www.ssl. ox.ac.uk/advanced_search.html). He has specified keywords and tagging for post-search refinement. Of course, there are limitations to this service because only items indexed by Google can be included and we lack control over the ranking of results. However, we are in correspondence with Google and hope that we might be able to assist with deeper indexing through the addition of metadata.

Illustration 7

The University of Oxford decided to build a new multidisciplinary center for the Social Sciences in Oxford. The building was designed by Lord Foster &

Partners and included academic and administrative offices, seminar rooms, lecture halls, teaching rooms with IT facilities, a café and a library. By bringing together on one site many social science departments, it was hoped to increase interdisciplinary research. A new Social Science Library was created to support interdisciplinary research. It houses in one location, all the collections from eight separate departments. Responsibility for the design of the space and the provision of services was handed over to the Librarian who was expected to liaise with the relevant departments and the current library users so that all needs could be met by the new library.

What did we do to support interdisciplinary research?

On 1st October 2004 the University of Oxford opened its first Social Science Library. Integrating the collections of eight separate departmental libraries into a single whole was accomplished by means of the Library of Congress Classification scheme which allows us to arrange the books "in a logical order according to their degrees of likeness" (Prytherch). This then supports individual disciplines while allowing for easy browsing between disciplines. It was interesting that all of the departments were amazed that "their" collection had grown as a result of the move into the Social Science Library.

In contrast, the print journals are filed alphabetically because trying to assign a single subject to a social science journal appeared to help no discipline. Academics have commented on how this arrangement has increased their knowledge of related subject areas as they browse to either side of "their" journal. One might argue that this works well because all the titles are in support of the social sciences.

The Bodleian Library, created in 1602, has used a wide variety of classification schemes over the centuries but the most enduring is one that classifies by size. This is of course an efficient means of storing books in stacks that are closed to readers. The modern reader uses the online catalogue to find books by means of many different indexes. The book can then be requested and delivered to the reading room or library selected by the reader. If a book is on an "open shelf" it might be a lending copy or a copy confined to the library but it cannot be delivered to another library. Therefore, the interdisciplinary researcher prefers to have interdisciplinary books held in the closed stack so they can be delivered to the library of choice. For example, an academic working on Eastern Europe might be a humanities scholar or a social scientist. She or he might wish to consult the book in the Social Science or the Taylorian Slavonic Library.

The distribution of funding determines how a subject is supported. We have retained discipline-specific budgets for printed materials, and where possible, for electronic resources. The key to our success has been to have a single subject consultant, Mark Janes, who manages and spends up to twelve separate budgets. We have found this to be efficient and productive. The overlap be-

tween Economics and Development Studies, between Sociology and Anthropology is considerable. When we had more than one subject consultant much time was wasted liaising between librarians to work out who should pay for what. We found it better to have one person looking after all the budgets, with a vested interest in all the subjects. He has two main rules. He considers the *purpose* of a purchase rather than its subject, and when trying to differentiate between related subjects, such as politics and modern history, he considers the *approach* of the author rather than the subject of the book.

A 2008 document from the Social Sciences Division supports this approach: "Common to every discipline is a methodological debate about whether problems and their solutions are best understood using formal models, using quantitative analysis, using 'evidence-based' analysis, or by using other qualitative methods, such as structured case studies, anthropological investigations, institutionalism, social capital, or historical enquiry" (Social Sciences).

Electronic resources support interdisciplinary research in a number of ways. First, the publisher deals mean that a library often finds it is less expensive to buy all the journal titles of a particular publisher rather than to buy individual titles. This has increased the range of titles available to our readers. For example, many academics have told me about how cross-searching of journals in JSTOR has resulted in their reading more widely. Academics also told me how the ease of finding and reading abstracts on the Web of Science has changed the speed with which they can gain an overview of a new subject or topic.

Requests for full-text e-journals and e-books have escalated in the social sciences. Meanwhile, fewer and fewer researchers appear to be using bibliographic databases. As a result, we are spending more money buying primary and secondary data and e-journal packages. Bibliographic databases devoted to a particular discipline, such as EconLit, are still used but the real demand is for full-text.

Illustration 8

Archaeology is a discipline that straddles the Humanities, Social Sciences and Sciences. The Head of the Archaeology Department at the University of Oxford, Mark Pollard, noted that what is "increasingly important in archaeology is how we can encourage researchers to contribute to group solutions of problems and cross outdated disciplinary boundaries." He argues, with co-author Peter Bray, that "progress has not been dependent on overcoming supposed fundamental differences between the humanities and sciences; instead it has been based around cooperation on the vast tracts of common ground" (Pollard & Bray, abstract). Instead of concentrating on inter-disciplinary or cross-disciplinary research, the authors look at the integration of approaches and the possibilities for equal partnerships between different academic approaches.

Let's return to the idea of a Renaissance man or woman and consider the following statement: **"**If we assume…that all knowledge can no longer be en-

compassed by a single skull, then the key question is how can cooperation
between individual specialists be made to achieve results … the overall lesson
is that we must act to ease the sharing of information rather than passively
extolling the virtues of cooperation. As with all communication, this demands a
mutual respect and understanding of the various languages involved. Therefore,
the multilingual translator – not a renaissance person, but someone who can
fluently move between disciplines – plays a key role" (Pollard & Bray, p. 2).

This is an encouraging statement since the aim of most librarians is to share
information! We need to consider how we might provide a translation service
to help our social scientists move fluently between disciplines.

CONCLUSION

Oxford University's Pro-Vice-Chancellor Ewan McKendrick argues that the
"problems that confront our society increasingly defy disciplinary boundaries
and much of the world-class, cutting-edge research…is taking place across the
disciplinary divides" (McKendrick). The Social Science Division believes that
"social scientists should be playing a more significant role in policy formation,
including the provision of good-quality evidence, based on methodological
rigour" (Spence).

Librarians and information specialists have a crucial role to play in support-
ing interdisciplinary studies, a form of research and teaching where each
discipline continues to be separate and distinct in its approach to a subject, but
where the findings of each discipline are integrated so that creative and practi-
cal solutions are found to solve a problem. We can do this by the following
means:
   – create library spaces conducive to interdisciplinary studies
   – organise our print collections to encourage interdisciplinary conversa-
     tions
   – provide a translation service that aids in the location of related materials
     to expand the real and virtual interdisciplinary collection
   – package our documentation and training to support interdisciplinary
     teaching
   – use the Internet creatively to provide additional links and services
   – re-use the services familiar to our readers to promote our e-resources
   – create our own IT services to support interdisciplinary studies

Librarians can play a significant role in encouraging interdisciplinary research
and teaching by providing both reactive and proactive support to our library
users.

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BIOGRAPHICAL STATEMENT

Margaret Robb is the Bodleian Social Sciences Librarian for the University of Oxford. She is a member of the Bodleian Libraries Cabinet, the Social Sciences Divisional Board and two of the University's policy committees. She manages eight libraries with over 85 staff, and works closely with the academic depart-

ments that are part of the Social Sciences Division, including the School of Interdisciplinary and Area Studies. As a Fellow of Linacre College she has the opportunity to discuss topics relevant to the support of research and teaching with a wide variety of academics and postgraduate students.

WALLS TUMBLING DOWN: OPPORTUNITIES FOR LIBRARIANS IN INTERDISCIPLINARY RESEARCH

Jeffrey A. Knapp

At the dawn of human civilization, when our ancestors applied their knowledge to survive or advance themselves, it is unlikely that they had any use for what we refer to as "disciplines" of knowledge. For example, hunting was not a study of economics (the need to hunt), anthropology (the tools they used to hunt), or physics (the flight of the spear through the air) – it was a means of solving the problem of hunger. Of course, we understand today how each of these scholarly disciplines can play a part in understanding these early hunters, but it is unlikely that they were on our ancestors' minds. They were using what knowledge they had, without discrimination, to address their immediate problems.

As their pool of knowledge grew, and as scholars began to focus increasingly on more specific areas of study, descriptive terms for general groupings of knowledge likely developed to make communication easier. For the same reason a collection of ten books does not require a library catalog to describe its contents, disciplines were not needed when humanity's shared knowledge was small. As time passed, and humankind's knowledge grew and developed, its complexity required classification, which ultimately resulted in the disciplines we know today.

As our knowledge has grown – and certainly it has – we can liken it to the growth of a tree. Beginning with a single trunk, it eventually grows branches. These branches in turn split into more branches, until not only are there many branches, but they begin to touch and even cross over one another. The same can be said for our knowledge. However it has grown or developed, there is no question that overlap exists, and in some cases there is even difficulty in defining exactly where one discipline begins and another ends. This must not be viewed as a problem, however. While some might view this analogy as meaning that our ever-thickening tree is resulting in confusion and impenetrability, we can also view the crisscrossing branches in our example as increasing the number of paths of inquiry we can take to find the answers to our questions.

Disciplines therefore are not a bad thing, but they must be viewed for what they are: a *descriptive* means of categorizing our knowledge and paths of inquiry. Disciplines are derived by humans and not handed down to us from the heavens.

The birth of the Social Sciences themselves practically created the idea of interdisciplinary studies in the early 20th century (Klein, 1996, p. 8). Librarianship itself is one of the most interdisciplinary studies of all. In the process of

studying the arrangement of knowledge and information, it stands to reason that librarianship inevitably borrows aspects from all of the disciplines.

If interdisciplinary studies is not a new concept, why does it seem so pressing now? One reason could be the speed that the internet has brought us. For scholars wishing to do research in a discipline outside of their own, for example, they no longer have to travel to a different subject library located elsewhere on campus. Nor do they need to learn new research methods or use unfamiliar print indexes to locate scholarly literature. They do not even need to know the titles of any of a discipline's scholarly literature in order to get started in it. They can simply log into a computer, select a database, and with little advanced training, retrieve a competent set of scholarly articles in this new discipline. This is by no means a replacement for working with an expert in a certain new discipline, but nonetheless, even doing a simple search in Google can help a scholar identify an expert in a new discipline whom they can contact, and bypass a great deal of time and drudgery in the process.

Anecdotally speaking, scholars seem to be increasingly customizing their areas of study, often by studying in multiple subject areas, or melding aspects of two of them together to create a unique area of study. It is not uncommon nowadays to see titles such as "Professor of English and Women's Studies," or "Professor of Media Studies and History." This blurring of the boundaries between disciplines will likely increase as newer scholars, whose studies occurred entirely within the internet age become more of a presence in academia.

INTERDISCIPLINARITY IN ACADEMIA

In order to gain an understanding of interdisciplinarity as it is viewed outside of library science literature, books were searched that included the term "interdisciplinary" in the Library of Congress Subject Heading. From these results, it is clear that there is no shortage of discourse about social sciences and interdisciplinarity. What may be surprising to some is how long it has been discussed. While the literature this paper focuses on is primarily scholarly articles and books from the past 15 years, one of the most relevant works dates back to 1969 (Sherif & Sherif, 1969). In his introduction to *Interdisciplinary Relationships in the Social Sciences,* a collection of lectures delivered at a 1967 Symposium on the topic, Sherif argues that interdisciplinary borrowing is not new, and that even in 1967, the natural and physical sciences were borrowing from each other. He further states that, "It is when borrowing involves the social sciences that interdisciplinary effort becomes a matter of controversy, beneath the dignity of a natural science," (1969, p. xii) expressing the feelings of frustration social scientists likely felt (and perhaps still feel) in an age of natural and physical sciences "chauvinism," so to speak.

In this same volume, Milgram (p.103) weighs in on the benefits of interdisciplinary research. He states "When a social scientist frees himself from the

narrow grooves of his academic discipline, a new range of intellectual problems is made accessible to him, and new paths of inquiry open."

Even in terms of our current disciplinary structure, Klein (1996, p. 55) tells us that it is only a recent development, a little more than a century old. Despite this newness, however, she correctly states that it is nonetheless responsible for the current administrative and academic structure of most colleges and universities today – which can cause difficulties for the interdisciplinary scholar in search of financial or organizational support.

There are many examples of success resulting from interdisciplinary methods in research both within the social sciences and without. Calhoun and Marrett (2003, p. vii) note a few of these, including the use of immunology and anthropology in HIV/AIDS research, population studies of the health of aging populations, and the studies of the relationship between heart disease and social factors. Overall, however, Salter and Hearn (1997, p. 3) sum it up best by saying that interdisciplinary research is important from the practical perspective: "research is interdisciplinary because many research problems cannot easily be addressed from within the confines of particular disciplines. They require the concerted efforts of many people, each reflecting a different perspective."

Interdisciplinary studies have a high potential for new discoveries and the advancement of knowledge. New perspectives from scholars of different academic backgrounds usually provides at least a spark in igniting new advancements. An excellent example of an important new realm of interdisciplinary studies is Quaternary Studies, the study of the last few million years of the earth's history. Quaternary Studies incorporates, by some descriptions, 35 different academic disciplines, including anthropology, geology, geography, biology, climatology, history, and oceanology. Using knowledge from all of these varying disciplines, and threading them together in new ways, scholars in this area are uncovering amazing new observations about, among other things, humanity's effect on the environment, changes to the earth's climate, and how life on earth has responded historically to such changes. It would not be a great stretch to add to this list the social sciences of economics and political science, since the topic of climate change and humanity's responsibility for it has become an economic and political issue, as any follower of the American news media could attest.

Despite the demonstrated successes of interdisciplinary research, challenges and obstacles remain. Salter and Hearn offer this description of the status quo:

> Support from the universities, criteria of the granting councils' adjudication committees, support for learned journals, the organization of universities into departments, and the association of graduate degrees with specific disciplines all lend credence to the idea that disciplines are an inevitable and necessary component of intellectual work. (1997, pp. 20-21)

Salter and Hearn go on to discuss some other less-concrete obstacles, such as the association of interdisciplinarity with "intellectual fads and fashions," rele-

gating it to the status of a "luxury that universities can ill afford" (1997, p. 3)
They convincingly dismantle the foundations of these obstacles to their afore-
mentioned argument, but it seems clear that to those not involved in it, inter-
disciplinarity still has an air of illegitimacy that might be difficult to shake.

How is interdisciplinarity being discussed in library and information science
literature? Since the topic of this paper deals with the role a librarian can play
in facilitating interdisciplinary research, articles dealing with librarian roles
were researched using Library Literature and Information Science via EBSCO.
There were three main themes that were discussed in this area: "subject librari-
anship," i.e., the specialization of librarians along subject lines; "holistic li-
brarianship," which refers to librarians as generalists by library function, e.g.,
librarians who act as bibliographers, catalogers, and reference librarians; and
finally the challenges of cataloging interdisciplinary materials.

What kinds of problems does interdisciplinarity pose for libraries? The two
most obvious areas are the arrangement and acquisition of knowledge (collec-
tions and collection development) and identifying the knowledge (cataloging).

INTERDISCIPLINARITY AND COLLECTIONS

As the aforementioned Salter and Hearn quote states, we must acknowledge re-
ality in terms of the administrative organization of most universities along dis-
ciplinary lines. And while the intention of this paper is not to undermine or
"overthrow" this regime, there is no question that academic libraries, which of-
ten mirror this regime by organizing along subject lines can pose some obsta-
cles to the scholar pursuing interdisciplinary research, and to the librarian try-
ing to acquire interdisciplinary resources.

An interdisciplinary scholar might wonder, in a subject-based library, which
library they need to use for their studies. Take for example, a scholar studying
the history of the American civil rights struggle in the 1950s and 1960s as por-
trayed in the media. A history librarian might tend to focus on the historical as-
pects of the topic. But according to Hickey and Arlen, more than half of the
sources historians consult fall outside of the traditional Library of Congress Call
Numbers for history. Social sciences sources in the realm of civil rights, com-
munications, and perhaps political science and law could offer important in-
sight and background to this topic and a social sciences librarian could provide
them.[1] In this case, if the social sciences librarian does not refer the scholar to
the history librarian, the scholar is likely to assume that all the materials avail-
able would be found in the history library and not inquire further. The point is
that librarians must be able to "surround" the scholar's area of research to at
least be able to suggest other areas of inquiry or refer them to another specialist.

Developing collections is the other major issue with interdisciplinarity.
Since most academic libraries tend to be organized along subject lines, collec-

tion responsibilities (and their attendant budgets) tend to be similarly organized (Hickey & Arlen, 2002, p. 97). How do you split up the responsibilities? And, perhaps most importantly, which budget should pay for newer materials in this field? Short of designating a librarian the "interdisciplinary selector" and giving her/him a dedicated collections budget, the best course is to make sure that communication mechanisms (e.g., meetings, discussion boards) are in place for selectors to be sure that certain areas are being covered. Interdisciplinary areas are often in danger of "falling through the cracks" during the selection process, due to selectors assuming that "the other person" will be buying it. The selection process should have a very social component to it, to encourage selectors in fields that often cross over each other to work together for greater good of the collection (Hickey & Arlen, 2002, p. 97).

INTERDISCIPLINARITY AND CATALOGING

No cataloging system is perfect. Cataloging is a descriptive framework for the items in a collection, and no matter how good it may be, it can never completely replace the experience of having the item in front of you. Subject headings and call numbers have evolved along with the disciplinary structure of academia and therefore are of help only to the interdisciplinary scholar who understands the disciplines she/he is crossing.

Librarians, this author included, in the past have often looked down on full-text searching as somehow beneath their professional status and a somewhat blunt method of conducting searches. The subject heading searches that librarians did before the widespread availability of full-text online databases just seem to have more dignity to them, in a professional sense. When one considers search precision, searching by subject headings invariably produces better results. However, search precision does not carry the same level of importance it once did, (Google will pull up a million hits without having to think very hard about search terms) and such precision is not as important for interdisciplinary research. Interdisciplinary research is more about defining the disciplinary "ingredients" of the research (e.g., the identification of media studies, history and civil rights in the earlier example) and becoming aware of resource types (newspaper articles, television broadcasts, government documents) than identifying specific books or articles. In a practical sense, full-text searching appears to have a lot of momentum.

But how can full-text searching be utilized if no electronic full-text copy exists for an item? Outside of the Google Books scanning project, which aims to create full-text records of books from the collections of many of the largest academic libraries in the United States[2], there are two options. Annotations and/or Table of Contents are available for inclusion in MARC records from a number of library vendors, including the Library of Congress itself. Including

either of these two items in catalog records can increase the "findability" of interdisciplinary items by describing them in language more accessible and universal than that of the rigid, controlled subject headings.

"Web 2.0" functions such as tagging, can create an entirely new lexicon for subject headings that flow "from the bottom up," i.e., from the users into the catalog, rather than "from the top down," i.e., from the professional catalogers down to the users. Such user-generated tags should not *replace* controlled subject headings, but rather complement them. Allowing users to "tag" items by adding their own descriptive terms to catalog records will also provide better findability to interdisciplinary materials by more immediately incorporating new terminology into catalog records. One of the problems with traditional cataloging methods is that they assume a sort of omniscience, or a sort of bird's eye view of how the totality of knowledge is organized in assigning subject headings and subject terms – in short, they are designed to help *librarians* locate items more than the average scholar. And, they assume that the scholar is aware of precisely what it is she/he is looking for, which is sometimes true – but not always.

A good example of this is census data or demographic data of any kind. A librarian or other social scientist[3] understands the value of census data and its usefulness for a broad range of research. But scholars in other disciplines might not. If a scholar had the capability of tagging a catalog record to reflect how she/he would describe the material, a more rich body of descriptive terms would result, aiding the record's chances of being found using the ubiquitous keyword search.

INTERDISCIPLINARITY AND THE ROLE OF LIBRARIANS

Interdisciplinary studies should not be feared or avoided. This is a development that librarians must embrace enthusiastically. While it is important to maintain librarians with subject specialties who are experts at the specific sources and research strategies necessary for the traditional disciplines, all librarians should also have the ability to direct a scholar to other relevant disciplines and help them navigate the overall Body of Knowledge. Boissonnas (2001, pp. 40-41) has written about the trends and problems of overspecialization in libraries, and states very eloquently:

> Library work is not about dealing with knowledge as units of information; rather it concerns handling knowledge within the context of human experience. Overspecialization carries the risk of shutting out some of that human experience. Like the lousy doctors who are wonderful medical technicians, we run the risk of becoming great information specialists and lousy librarians.

Boissonnas is actually referring to becoming too specialized by function, e.g., technical services vs. public services, but it is equally applicable to interdisci-

plinarity. "Human experience" does not exist in neatly divided disciplines. It is impossible to discuss the major questions facing the world, such as poverty, the environment, or peace, without being interdisciplinary (McNicol, 2003, p. 23). Boissonnas also discusses the concept of "systems thinking," where the focus is not on individual components, but all of the components comprising a system and their interrelationships. This is equally applicable to the role of a librarian in interdisciplinarity.

Librarians are no longer the "gatekeepers" of knowledge (Fletcher, 2001, p. 6). The Internet revolution in knowledge accessibility has been an amazing transition for society, but librarians know that their profession is still necessary for the future of scholarship. This might not be as clear to the rest of academia, however. It behooves librarians to be as flexible as possible to ensure that their universities can see the benefits of working with librarians. Assisting scholars navigate and understand the literature of their disciplines – and the literature of other, related disciplines – is a niche in academia that librarians are uniquely qualified to fill.

Take HIV/AIDS as an example: a medical researcher working only in a medical library might be familiar with all of the Medical Subject Headings pertaining to HIV and AIDS and with the associated medical Library of Congress Call Numbers associated with them in the Q's and the R's. Without a librarian who understands at least the existence of HIV/AIDS as a social issue, the medical researcher may be deprived of important relevant information in the H's or what important legal issues are involved (in the K's). This is a clumsy example, to be sure, since few researchers today depend only on call numbers or browsing library stacks to become aware of information – but overall, it is important to consider a new role for librarians as being people who can break out the components of a field of study and suggest paths of research.

MEETING THE CHALLENGES

How can librarians meet the challenges of interdisciplinary studies? By cultivating in themselves a wide breadth of knowledge. And although it may sound almost comically simple, the rigorous and regular reading of general interest periodicals is one way of doing that. The key here is that the periodicals *not* be scholarly journals, but should be written for an educated audience. Why not scholarly? Because interdisciplinary research implies some level of research in a discipline in which one is not an expert. Few, if any librarians can have subject specialist experience (or advanced degrees) in all the disciplines that frequently come in contact with others. Trying to regularly read the scholarly literature of disciplines outside of one's main area of expertise can be mentally exhausting – which will reduce the possibility of keeping up with it. Favorites of the author are magazines like *The New Yorker* (a weekly), and *Wired* (a

monthly) but any magazines that provide coverage of a broad spectrum of subjects, including politics, social issues, finance, the arts, science, technology, literature, and history will work. Even the regular reading of a major national newspaper will provide coverage of significant issues in different fields. Librarians must keep attuned to developments in these fields, so that they can think about how they are connected to other fields of study.

For those who prefer to do their reading online, the regular reading of a broad range of news feeds (via any of a number of RSS readers) is another worthy strategy. The only potential problem with this strategy is that there is a great deal of customizability involved in the choice of feeds and the choice of article to click on and read. Being too customized can be counterproductive in this area, since part of the benefit of reading a breadth of literature like this is the possibility of encountering an unusual or unexpected article – an item that would not have been consciously searched for, but appreciated once found nonetheless.

Librarians must also cultivate a social dimension in their work. Finding ways of connecting with faculty either in social settings or professional meetings, librarians must leave the library regularly to keep in touch with their constituent students and faculty to get a feel for the type of research they are doing and what type of resources they are using. Librarians must be able to recommend resources and strategies to their constituents, and must not wait to be asked. Proactively working with individual faculty and academic departments, librarians must ask to address departmental meetings and highlight new resources. They must take advantage of whatever social opportunities there are at their institutions to introduce themselves to faculty and students, find out what their research interests are and make connections. Librarians must get out into the scholar's world, and network with faculty in different areas of expertise. Ultimately, one of the most valuable services librarians can provide to the faculty they serve is to help them to understand when they should go outside their "disciplinary comfort zone" for their research.

In the end, whether librarians choose to embrace interdisciplinary research or not, they must at least be aware of its growing importance. It is clearly a solid direction of a growing body of research and librarians have an opportunity to cast themselves as the navigators of the living, breathing – and increasingly interconnected – landscape of knowledge.

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NOTES

1. This example assumes, of course, that history would not be part of a social sciences library, but part of a humanities library, which is not always the case.

2. The author is employed at the Penn State University Libraries, a member of the Committee on Institutional Cooperation (CIC), a consortium of 12 large research universities. The CIC is has a cooperative agreement to digitize up to 10 million of its volumes in Google Books. More information can be found at http://live.psu.edu/story/24623.

3. a librarian, the author considers himself a social scientist.

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Jeffrey A. Knapp is a Reference and Instruction Librarian at Penn State Altoona in Altoona, Pennsylvania, U.S.A. He also teaches an online undergraduate course for Penn State's World Campus in the use of U.S. government documents and law sources in social science research. Prior to his current position, he worked at Penn State's University Park Campus in the Social Sciences Library. He generally is interested in everything, and likes to ponder the interrelationships between disciplines.

'NEW KIDS ON THE BLOCK': DEVELOPING A SOCIAL SCIENCE STRATEGY IN THE BRITISH LIBRARY

Jude England

INTRODUCTION

The British Library plays a major role in supporting the UK's research infrastructure and in 2004 identified the provision of research-led information and resources to the social science research community – users, producers and commissioners – as a key area for future emphasis. Our work since then to develop and implement a dedicated social science strategy in a national library suggests that the age of inter-, multi- and even trans-disciplinary research has arrived. Moreover, social scientists are eclectic in their use of research material and methodologies – the best of them, very much so. There are, however, considerable variations in the attitude and approach of researchers in different disciplines, including their desire to collaborate. Funding pressures create intense competition, which militates against collaboration. Furthermore, our informal discussions with researchers suggest that there is a tendency at times to launch into primary research without adequate review of previous research. Research carried out by the Library in 2008 suggests that the ease of access to material via internet search engines creates researchers who 'view' rather than 'mine' information [1].

From the perspective of a national library which began its formal existence in 1753, many of the disciplines sitting under the social science umbrella are relatively new. Inevitably, social scientists are viewed as the 'new kids on the block'; as a result there is little organisational knowledge about what they research, study and contribute. It is also important to note that historically the Library has thought in terms of its 'collections' which are defined by format and location/country of origin, rather than content or theme. Conversely, social scientists are much less interested in how the information comes, or where it is from, unless these issues are the specific subject of their research; one of our key challenges has been, therefore, to develop relationships with our colleagues in other collection areas to facilitate access to the wealth of content in the Library.

This background forms some of the context to the task of developing a social science strategy in the British Library (referred to the BL and the Library in abbreviation). My paper discusses the processes and issues involved in its early development, looking at the period autumn 2006 to summer 2008. The views expressed in it, and any errors, are the author's own ...

THE BRITISH LIBRARY

The history of the British Library as the national repository of the UK's social and cultural life begins in 1753, when the British Museum Act charged the British Museum Library to care for books, manuscripts and papers acquired by the State and make them available for *'publick use to all prosperity'*. The content of the Library evolved organically, rather than systematically until the mid 19th century, when legal deposit was actively enforced.

The British Library itself came into formal existence in 1972 via another Act of Parliament which brought together a number of national information institutions, with a wide range of functions and cultures. The Library did not have a major physical presence until 1998, when it moved into the St Pancras building, Even now, activity is split over a number of geographically disparate sites.

The Library holds some 170 million items, including over 13 million books, 57 million patents, almost 5 million items of grey literature, nearly 60,000 newspaper titles, and 3 million sound recordings. There are comprehensive collections of UK, US and European official publications, medieval to modern manuscripts, oral history, and, extensive collections from a range of intergovernmental organisations (e.g. UN, OECD). The Library has wide-ranging historical and contemporary international collections, and is building a UK-domain web archive.

The St Pancras building provides reading rooms for access to the collection material; there is also a significant public space, including exhibition areas and a conference centre.

The Library exists to support all researchers, whatever their background and purpose. This policy was implemented in 2004; until then use was dependent on proving a genuine research need and tended to be limited to scholarly researchers. Demand for reader passes since 2004 has increased year-on-year, but large parts of the research community still know little about the resources available.

DEVELOPMENT OF A SOCIAL SCIENCE STRATEGY

7. In 2004 a review was carried out of the Library's services to social science researchers. The decision to do so arose from a general perception that the social sciences were being marginalized at the expense of other subject areas. The review's findings pointed to the existence of strong foundations such as plentiful research-level material, a dedicated reference team and reading room. Researchers could access interlibrary loan and document supply services, and key collection development partnerships were in place.

Less positively, the review found that the Library had few links with social science research communities and that their knowledge of the Library was minimal. It also concluded that there was only patchy internal awareness of social science research and the needs of researchers, and, that the Library was not using its resources as much as it could to support the research community with dissemination and knowledge exchange.

The report recommended that the Library develop a specific strategy placing emphasis on collaboration with key partners, and on exploitation of our collections, expertise and resources to promote and enrich inter- and cross-disciplinary exchange. It also pointed to the need to strengthen resource discovery and build expertise and skills within the Library to enable us to understand and meet researchers' needs.

The British Library Board approved the recommendation for the creation of Social Science Collections and Research (SSCR) at the beginning of 2006, and a new head of department joined the Library at the end of September the same year. The first task was to build the team – which grew from four full time equivalents (fte) in October 2006 to 15 fte in January 2008.

THE SCOPE OF THE UK SOCIAL SCIENCE, RESEARCH AND ACADEMIC ENVIRONMENT

As a major national research library we have a wide user community – actual and potential – and need to be aware of their requirements. Also critical is awareness of the major policy and funding drivers for research as they influence need and demand for information. This is not a straightforward task as the scope of social science disciplines is wide, ranging from sociology, politics, business and management studies, economics and economic development, to human geography, education, psychology and linguistics. Also key are social policy, social work, anthropology, law, international studies, and government. Furthermore, for the Economic and Social Research Council, statistics, computing, infrastructure, demography, research methodology and capacity building are increasingly important.

As well as disciplines, the development of our offer must take into account the key research drivers. The Economic and Social Research Council (ESRC)[2] identifies eight research themes in its delivery plan for 2008-11; alongside these are a number of – mostly complementary – UK government concerns set out by the Cabinet Office Strategy Unit[3] (Table 1). These themes determine the direction of most research funding.

Table 1: Key UK research themes

ESRC Delivery Plan themes 2008–11	UK Government Concerns
Succeeding in the global economy	Globalisation
Migration and Population Change	Ageing and population diversity
Understanding individual behaviour	Economic prosperity
Energy	Family life and communities
Living with Environmental Change	Climate change
Terrorism, Security, Global Conflict and Uncertainty	Crime and public safety
Lifelong health and well-being	Life chances, talent and social mobility
Digital Economy	Modernisation and renewal of the constitution and democratic institutions

UK research is carried out in a wide range of organisations including higher education institutions (HEIs)[4], government and related bodies (central and local), research institutes, and the third[5] and private sectors[6]. Many social science researchers move to work in professions like market research, advertising and public relations. Market research organisations in the UK are themselves an important supplier of social research services.

Research funding

Funding for social science research in the UK comes from a wide range of sources, including the ESRC, philanthropic foundations, central and local government bodies, and, some major corporate organisations, who support research activity through their corporate social responsibility arms.

Access to funding is uneven – and competition is fierce – within the academic sector, between the academic sectors and others. Researchers outside academic institutions tend not to have access to resources available from the ESRC and the major foundations so tend to be even fiercer rivals for research commissions and scarce resources.

Current issues for the UK social science research community

The use of evidence-based research and evaluation to support policy and programme development has increased enormously in the last 10-15 years within the UK, accompanied by a comparable increase in the size of the non-HE based research community. Not all researchers welcome this emphasis on a thematic, policy-driven, evidence-based research funding regime rather than 'pure' re-

search; some (particularly academics) resent fitting their interests to a set agenda in order to obtain funding. However, things are likely to get tighter given the economic downturn of 2008/09 and the possible change of government in 2010.

Researchers also face the issue of managing the 'information and data deluge', while at the same time seeing the loss of dedicated information services as non-academic institutions cut back on information and library services – one researcher recently commented that her own use of the British Library had increased with the closure of her in-house library. Many researchers are simply doing less systematic background and contextual research on issues as a result. There is a growing trend for researchers to be 'time poor' and liable to want information immediately, to their desks; the Library's recent research on the behaviour of the 'e-generation' found that researchers as a whole – no matter what their chronological age – have developed a 'viewing' rather than 'mining' tendency when using the internet.

Finally, two other issues are having an impact on the research environment. First, there are growing concerns about the recruitment and retention of researchers. Some research areas are supported by an ageing community, increasing the importance of capacity building and knowledge transfer. Second, research councils and government are placing increased emphasis on dissemination and the impact and value of research, in particular, how to enhance public understanding of its purpose and outcome.

THE BRITISH LIBRARY AND SOCIAL SCIENCE IN 2008

The review of social science carried out in 2004 found that knowledge of the British Library was highest among academic researchers. This was not surprising as at this point access to the Library was dependent on proof of research need – most non-academic researchers simply assumed that its services were not for them. In 2008, two thirds of existing British Library readers continued to be from academic institutions, but our share of the potential population of social science post-graduates was small; just five per cent of over 300,000 post-graduates were readers, compared to almost a quarter of the eligible population in Arts and Humanities.

A survey of the users of the social science reading room in February 2007 found that almost three quarters of them were from higher education. A quarter were undergraduates; a fifth research postgraduates; around one in ten taught postgraduates; and the same proportion, teaching staff. Just a quarter of users were not from the academic community, and only a very small proportion of them were from the broader research community in government, non-governmental organisations, research libraries and professional associations, plus consultancies, funders and so on. This was an untapped audience in 2004 and remains so.

Findings from a scoping study of the collections[7], and our focus groups with social science researchers[8] reinforced the earlier evidence from research carried out for the review in 2004[9] that awareness of the content – and potential – of the Library was minimal among researchers as a whole, no matter what type of institution they were based in.

Furthermore, many of the researchers we spoke to in 2007 and 2008 – academics and others – did not realise they were *entitled* to use the Library.

Another issue emerged from our initial information-gathering activities: academic researchers were not interested in using the Library to access conventional e-resources such as journals and datasets as they have easy access to these through their home institutions. Conversely, researchers in non-governmental organisations have a much greater need for this type of material as they have less economic capacity and 'clout', but are time-poor and more likely to want remote access. This poses a real conundrum for the Library as most access to e-resources is through license and can only take place on site.

Scoping Study of the Collections

In late 2006, we signed a strategic partnership agreement with the ESRC. The purpose of this agreement is to:

> '… promote effective interaction between the BL and the ESRC in the development of their activities and plans for the improvement of information services for researchers.'

One immediate output of the partnership was the funding for the scoping study of the collections already mentioned. It was carried out in the summer of 2007 and involved three workshops, attended by 34 researchers from a variety of research interests and, a quantitative survey completed by some 200 researchers.

The study confirmed that levels of awareness and familiarity with the Library and the potential of its collections was low; little use was made of the broad range of resources (Table 2) and just a fifth of the respondents had a readers pass. Levels of awareness were low even among these researchers who might be expected to draw on the Library's extensive collections of UK official publications and those of international non-governmental organizations such as the European Community, the World Bank, UN and OECD. In fact, one of the workshop participants was writing a book on the World Bank and had not known about the Library's holdings in this area.

Table 2: Use of the British Library's resources
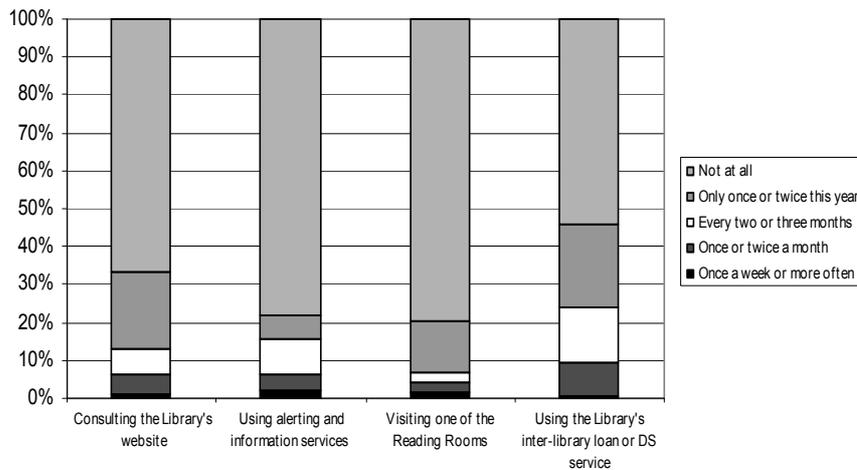
The study identified a number of additional barriers to, and constraints on, use of the collections at the Library. These included physical location, time, distance and cost of access, plus the lack of easily accessible information about the services provided. Many of the respondents to the study felt that the range, depth and organisation of the collections were daunting and did not offer an 'easy way in'; finding aids and resource discovery were described as inadequate.

Not all was gloomy – even participants in the study with little experience of the Library identified its strengths. They recognised the possibilities inherent in the historical depth and geographical strength of the collections, plus the range of subjects and formats. The availability of official publications, government statistics and publications from international and multi-national organisations was also valued.

The research collected views on developments that would encourage use of the Library (Table 3). Predictably, enabling remote access to material was at the top of the list but around six out of ten were keen to see improved online searching facilities. The same proportion recommended the production of research-led topic guides to the collection (both print and online), about half were interested in improved research and current awareness services, and almost half responded positively to a suggestion of BL mediated research communities. Four out of ten were interested in receiving information on collections not held by the BL, and a similar proportion in one-to-one advisory services to assist with research. But only a fifth were interested in research skills training.

Table 3: Developments to encourage use of the British Library
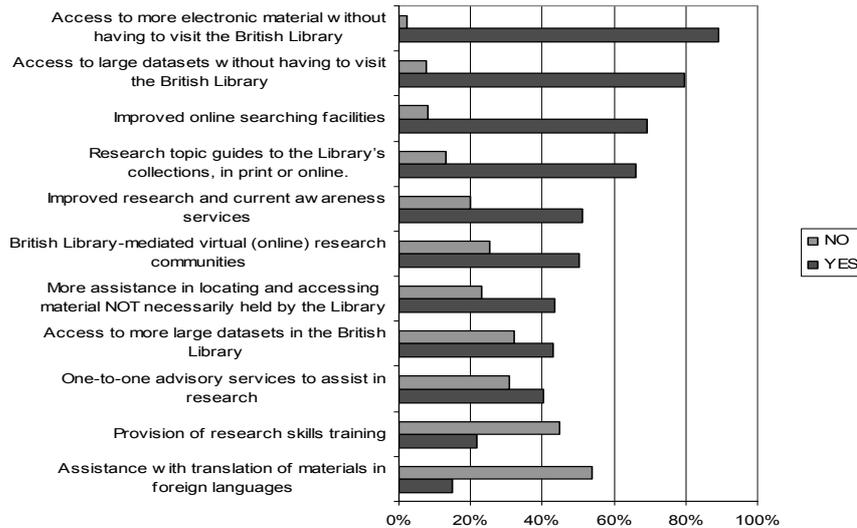
As we had anticipated, the study recommended we needed to improve publicity and promotion aimed at researchers, funders and university libraries to increase awareness and knowledge of the a BL. It suggested we establish BL-ESRC fellowships programme linked to ESRC Programmes and Networks to interpret and exploit the collections and open up the less accessible areas. Support for researchers was to be provided through the development of web-based topical and thematic guides for 'e-scholarship'. The report emphasised the need to work on the provision of remote access through licensing for holders of a BL Readers Pass and develop more detailed indexing of all new social science material, with metadata for content as well as provenance and form. A resource development programme was proposed, perhaps including retrospective cataloguing, but also exploring the possibilities of social tagging and web 2.0 technologies.

THE STRATEGY

The main purpose of Social Science Collections and Research within the British Library has been agreed as:

> To support social science researchers by enabling access to, and exploiting, our collections and content; collaborating with key research and information service players; and, by connecting with the content and collections of others.

Within five years, our aim is to be playing a leading role in the management, provision, transfer and generation of information social scientists need and use.

We will be actively exploiting aspects of the Library's collections through collaborative research-led activities. Building collections for future researchers is another theme. We also aim to become an active – and sought after – hub and facilitator for the exchange of ideas and information between researchers, practitioners and policymakers – both within and across communities of interest and sectors – as well as engaged in promoting the public understanding and awareness of the value and role of social science research. A key element of these activities will be to contribute to the development of the next generation of researchers.

This is against the background of a number of major fans who understand the point of the Library – whether as a primary or secondary research source – and are very enthusiastic about collaboration, coupled with the requirement to build a new 'business' within the Library, developing our 'hook' for non-users and improving access to the collections. Crucially, improving knowledge and awareness of social science across the Library is essential.

In short, we do not believe it is enough for us to simply say that social science has reached the British Library and that we have enticed more readers through the front door. We believe have a key responsibility to contribute to knowledge exchange as well as knowledge creation, through collaboration and facilitation, making the best use of all the resources – from content to conference centre – available at the British Library. All our evidence suggests that many social science researchers are using libraries less and less as a source of information, but that the pulls of networking and sharing of issues, ideas and problems provide a more all-round attraction.

Strategic Priorities

Five strategic priorities are directing activity for the next three to five years:

- team creation and development;
- defining and developing a Social Science Collection;
- relationship and awareness building;
- improving accessibility; and,
- supporting, and working with, the research community to build capacity.

Team creation and development

Team development has taken place in three stages, starting with the appointment and establishment of the head of the department (September 2006), and concluding with the final phase of recruitment of content specialists in January 2008.

The head of department comes from a research background. The Library felt this was necessary to build credibility with the research community and improve the profile of the Library. The disadvantage of appointing someone without a library or information service background was the steep learning

curve required on some of the more operational and methodological issues and systems.

The wider team was deliberately recruited to include a mix of skills, from those with a research background to those with qualifications in, and experience of, library and information services. Given the mix of potential users and the emphasis on engagement, interpretation and exploitation of content, selection was guided by the ability to communicate, influence, put together an argument and respond to challenge. We also looked for disciplinary knowledge as well as evidence of the ability to transfer and apply skills and experience to different environments and audiences.

The jobs were billed as 'content specialists' rather than 'curators', 'librarians' or 'subject consultants'. The purpose of doing so was to emphasise the outward facing aspects of the role, place emphasis on active knowledge and awareness of research issues and the needs of researchers, and on the ability to draw out relevant resources from the disparate collections held by the Library.

The designation of 'content specialist' has certainly been an advantage with external researchers and our ability to work with the range of researchers, information specialists and librarians has given the Library a tangible form. Less positively, it has caused some confusion and perhaps set the team apart from their colleagues within the Library, whose main primary responsibilities centre on the acquisition and curation of collection areas.

Building a Social Science Collection

Material of potential use for social science researchers is dispersed across the Library. Initial activity has concentrated on mapping it by discipline, regardless of format or geography. Content teams, with representatives from all curatorial departments, were formed to implement the content strategy and are supporting this activity. The scale of the task makes it essential to prioritise work within discipline. Mapping by research themes is also featuring where team members have an existing expertise.

Relationship and awareness building

This paper has highlighted the importance of engaging with the key social science research communities – both researchers and information providers. One mechanism has been focus groups and visits to researchers. On the whole, we have met with an enthusiastic response, with people happy to give their time and support our activity. There have been some exceptions, often defined by discipline, who simply do not think we are relevant to them. For the moment we are concentrating on those who are interested; this provides an easy – and fruitful way – of narrowing the scope of our activity. Additionally, we suspect that building momentum will itself attract the harder-to-engage and reach communities.

With our general success and warm welcome we have become more and more conscious of the need to manage expectations – not promising more than we can deliver – while maintaining momentum. In this initial development phase it has been essential to get out there to as many institutions as possible; there is no doubt that this has been invaluable for the team in enhancing their awareness of researchers and the concerns of the research community. Our impression is that information professionals do not necessarily place always emphasis on listening to researchers and getting information on how they work, but more on pure information needs. As a personal view, it is much more difficult to engage with researchers without this level of understanding.

Improving accessibility

Improving accessibility to the collections and content of the Library – and collections elsewhere – is a key aspect of developing the social science strategy. As format and geography has taken precedence over subject in the British Library (whether topic, research theme or discipline), it would be a massive task to attempt to improve accessibility through cataloguing. In fact, within the Library as a whole we are devoting considerable efforts to improving our current cataloguing so the researchers in the not-too-distant future will be able to use a very wide range of search criteria. This leads to a key issue for the team, how to identify issues they can influence and separate them from those which are completely outside their control. Most cataloguing, for example, takes place in another directorate and location; decisions about the type of access software are made corporately; licensing arrangements for remote access are also corporate issues.

Within Social Science Collections and Research we have adopted various approaches to accessibility within our control. These include developing and expanding existing indexing and abstracting services, reviewing and updating existing collection guides and bibliographies according to discipline and research themes, and providing subject pages. We are exploiting the potential of events such as the 2012 London Olympics and the 2011 UK Census as a way of (a) highlighting the breadth and diversity of the work of social science researchers and (b) the multi-disciplinary potential of the Library's collections; and, exploring ways of enabling remote access to material. Activities include the development of a dedicated subject portal for management and business studies. The proposed subject portal will enable readers to access relevant subject material by working in collaboration with publishers but, importantly, will also include editorial provided by leading academics in the field and aim to make most use of the interactive ability of web 2.0. We have also held initial talks with the Economic and Social Data Service to open access to non-HE users registered as readers with the BL; raising the issue of more general remote access for readers to material held elsewhere, including publishers.

Identifying opportunities to exploit and interpret parts of the collection is another key activity. For example, we hold sound recordings of children's games and rhymes from the 1950s and 1960s. An initial idea to digitise this collection with the aim of improving access has developed into our collaboration in a successful research proposal looking at the role of children's play and games more widely. Additionally, we have taken advantage of three month placements funded by ESRC, where Phd students are based in the Library to carry out specific projects. Two students spent time with us in the summer of 2008; two more are booked in for 2009.

A key issue for the team – and, of course, the library world as a whole – is the capture and management of e-print formats. A particular focus is the move of UK government material to web publication. We are involved in a government-led initiative on web continuity[10], and a feasibility study[11] to assess the potential of establishing a virtual reference desk service for e-born government material. We will also be looking at the issue of e-born grey literature and are setting up a project to monitor publication and deposit over the next year or so.

Supporting, and working with, the research community to build capacity

One of the principles agreed by the British Library Board in 2006 was to focus on research skills training. However, the UK social science research community is relatively well provided for in this area – our scoping study and focus groups suggested that only a minority of researchers is interested in such provision. We have, therefore, widened this principle to encompass knowledge transfer, exchange and more general capacity building.

We have decided to place emphasis on the issues of methodological rigour, quality and validity, but we also want to promote the Library as a venue (actual and virtual) for multi-disciplinary, cross-profession/function knowledge exploration and information exchange. Initially our strategy has been to deliberately host events; building relationships, raising the Library's profile and opening the door to those who would not necessarily have thought to use us. This has also increased our profile and awareness of the Library as we feature on publicity material and give an overview on our activities.

Three examples of the variety of events follow. During the UK's annual festival of social science week in March 2008, we jointly hosted an event called *Making policy – Making social research*, attended by over 100 researchers. Our co-hosts were the Social Research Association. In July 2008, we hosted the British Sociological Association's Food Studies Group conference, providing an introduction to the Library to at least 150 researchers, and in November 2008 we ran an event to celebrate the 10th anniversary of *Welfare Reform on the Web*, an abstracting service for social policy researchers and practitioners. This took a workshop format, attended by around 40 practitioners and researchers, and debated the issues raised by a key note presentation from Pro-

fessor Ruth Lister of Loughborough University on *Social Citizenship, Human Rights and Poverty*. An extensive programme was in place into 2009.

We are in the early stages of developing a long term studentship and fellowship programme, and supported two successful bids to the ESRC for seminar series', one on the influence of multi-modality and e-learning on the nature and format of doctoral theses in education and social science (with the Institute of Education and others); the other on corporate social responsibility (with CASS Business School and the University of Sheffield). Internally, members of the team are supporting the Library's Learning team with workshops for schools e.g. on history, citizenship, language, food and geography.

Another initiative includes working in collaboration to develop a public engagement programme (in the medium term) with the ESRC and the Academy of Social Sciences. The aim of this will be to contribute to activity around the theme of *'why research matters'*, essential in a climate where concerns over falling response rates for research and public unease as to confidentiality and security of personal information are both growing.

CONCLUSION

The purpose of this paper has been to give a flavour of, and outline, the challenges and opportunities involved in developing a cross-collection, multi-disciplinary social science strategy in a national library.

Traditionally, the British Library's focus was on collecting and safeguarding the nation's cultural and historical memory, but the last decade has seen increasing emphasis on interpretation and supporting research. Consequently, the Library is moving toward a content-focused approach, but this process is new and challenging for the staff concentrated into format and geographical remits. A further challenge then arrived in the shape of Social Science Collections and Research, where a team with a clear requirement to look across the Library at content, access and interpretation, was added to the collections-focused structure. An essential, but not always easy, task for SSCR has been to develop relationships with our colleagues in the format and geographical collections.

Identifying material relevant to the social scientist held by the Library is a major task, added to by the fact that some of the non-users we have spoken to do not perceive the Library as of contemporary relevance. It has, therefore, been essential to break the process into bite-sized chunks, focusing on specific categories of researcher – here looking mostly at research themes as opposed to disciplines. We have concentrated, on identifying research issues which will facilitate this process, but there is a tight balance between developing thematic knowledge and mapping content as a whole by discipline. We have found it necessary to do both.

Looking at the make-up of the team, our recruitment strategy proved successful. It is clear that it was essential to have a team with (a) strong communi-

cation skills and (b) an understanding of social science and social science re-searchers and (c) a subject interest. All have helped us develop links into the research community. The latter want to work with people who talk their language (which differs by discipline), know what the issues are, and can make the connecting links. At the same time the team includes members with long experience of the British Library; this has been of immense importance during our early development and while we are still 'the new kids on the block'.

One of the great joys of the British Library is the historical sweep of the collections and the fact that it contains both primary and secondary research data. For this reason we have (a) placed emphasis on collaboration, (b) prioritised capacity building around the rigour, validity and credibility of information and (c), focused on our potential as a hub for knowledge exchange. Academic libraries to some extent have a 'captive' audience and are driven by the interests of the academic staff in their institutions, though in the new digital world libraries as a whole are facing considerable challenges as to how to stay relevant to their users. No matter, at times we are envious of our colleagues in these institutions whose lives are guided by the rhythms of the academic year and linked to relatively homogeneous users.

As a national library we cannot rely on attracting social scientists without substantial 'hooks'; identifying these is, and will continue to be, a major challenge. At the same time, we have the opportunity to support efforts by the social science research community to raise public awareness of the role and importance of their research. We also have a key role to ensure that the Library's collections continue to include such a rich and diverse source of material for future researchers. We must therefore, be able to work both within and beyond disciplinary boundaries. The key challenge for the Social Science Collections and Research team is to manage this matrix of themes, disciplines and audiences to best effect.

NOTES

1. Information behaviour of the researcher of the future a ciber briefing paper, January 2008
2. The ESRC is responsible for the development of research and capacity building for UK social sciences, and a major funder of research activity in the UK university sector.
3. The UK government is a key funder of research, in the university sector, but also in the wider research community – including not-for-profit research institutes, the private sector, market research and so on.
4. The size of the social scientific academic community was estimated at between 14,000 and 30,000 in a report published by the ESRC in 2006. The lowest figure refers to research active staff in the core social sciences; the higher figure to academic staff engaged in teaching and research in all so-

cial science related disciplines. According to the Higher Education Statistics Agency, in 2005, some 588,040 undergraduates were studying social science and 294,935 post-graduates.

5. The third sector includes charities and other similar not-for-profit organisations.

6. Examples of the numbers: in Government Social Research alone there are some 1,000 researchers in 20 government departments; the Social Research Association has around 1,000 members across central and local government, higher education, market research, in independent institutes and in the CVS.

7. A scoping study of the collections – use, awareness and future development, focusing on globalisation and population change – was funded by the ESRC and carried out in summer 2007. Tables Two and Three are from this study.

8. This includes researchers also involved in teaching.

9. From the research carried out for the Review of Social Science in the BL in 2003/04. In fact, our impression when carrying out the focus groups was that awareness had changed very little since this work took place. Having said this, usage of the social science reading room has increased at a greater rate than that in other reading rooms in 2007/2008. At least some of this increase must be attributable to our activity in the research community.

10. This is an initiative run by TNA on behalf of the Cabinet Office, which has developed a solution to the issue of 'broken links' across government. We are working with the project team to ensure that the short term solutions for the broken links also facilitate our role in long term preservation and maintaining the continuity of the OP collection.

11. With the London School of Economics and Oxford University's Social Science Library.

BIOGRAPHICAL STATEMENT

Jude England joined the British Library in September 2006 as Head of Social Science Collections and Research. This is a relatively new post, responsible for the development of the Library's social science strategy. Before joining the Library, Jude's career was spent in research and consultancy, specialising in social policy research and employee relations consultancy. Her career started at the Office of National Statistics; includes time as a researcher in the higher education sector – at LSE and the University of York; in government – at ACAS (the Advisory, Conciliation and Arbitration Service); and in the not-for-profit sector – at the National Centre for Social Research, as well as in private sector consultancy. Most recently Jude worked as an Associate Director with a public policy research consultancy house – ECOTEC Research and Consulting Ltd.

DATA SERVICES

SHARE AND SHARE ALIKE? DATA-SHARING PRACTICES IN DIFFERENT DISCIPLINARY DOMAINS

JoAnn Jacoby

INTRODUCTION

In this paper, I review the literature on the data-sharing practices of social science researchers to examine when and how data is shared within a particular research community. Data-sharing practices are analyzed in the context of broader disciplinary norms, participation in data archives (which can be interdisciplinary, multidisciplinary, or discipline-specific), and new data-sharing policies instituted by funding agencies. Drawing on three case studies (anthropology, economics and population studies), a model of factors shaping norms is proposed to predict when and how data is shared within a particular research community. The implications different data-sharing practices have for interdisciplinary scholarship – and for libraries serving researchers across these domains – are also considered.

My interest in this topic derives from my involvement as a Library Liaison in a multi-instituional grant ("Investigating Data Curation Profiles Across Multiple Research Disciplines" IMLS/LG06-07-0032). Bringing together librarians and researchers from the University of Illinois Library, Purdue University Libraries, and the Graduate School of Library and Information Science at the University of Illinois, the Data Curation project examines scholarly practice related to data collection, management, publication and preservation, including "at which point in the research cycle are researchers willing to share data, with whom, and under what conditions?" The study also explores the role of academic libraries in supporting e-science activities, by studying how librarians can interact with scientists to make their research output available, identifying practices and tools to support further metadata development and capture workflow. The present paper draws on interviews with social scientists conducted as part of this study, but primarily serves as a literature review and analysis of previously published literature as a backdrop for interpreting current local practice.

DATA SHARING IN THE SOCIAL SCIENCES: AN OVERVIEW

Data-sharing is a topic of growing interest in the Library and Information Science (LIS) literature as libraries seek to define their role with regard to data stewardship and preservation as part of broader e-scholarship and scholarly communications initiatives (Association of Research Libraries, 2006; Research Information Network, 2008). Attention to these issues has been also spurred by data-sharing

policies recently instituted by funding agencies seeking to ensure that their investment in research has the greatest possible impact. Many funding agencies, both public and private, are starting to either *encourage* applicants to specify a plan for sharing their data (e.g., the National Science Foundation, OECD), *require* such a plan for grants of a certain size (e.g., the National Institute of Health, for grants over $500,000/year) or *mandate* deposition in a centralized repository for awards of all sizes (e.g., Wellcome Trust).[1] These requirements are intended to make data produced in the course of sponsored research more widely available, facilitate the validation of results, and enable secondary analysis and meta-analysis – thereby ensuring that the research investment has broad and sustainable impact. The policies, however, must be backed by an appropriate infrastructure in order to produce the intended result. As some leading data archivists have cautioned, "data sharing rules may create more problems that they solve, because they can lead to a proliferation of web sites for self dissemination by researchers…which place long term access and preservation into question" (Gutmann, Schüer, Donakowski and Beedham, 2004, p. 219).

The existing infrastructure to support data sharing is uneven: highly developed in some areas and completely lacking in others. The greatest challenge, however, is cultural – open and systematic data sharing is simply not a part of the norms and habits of researchers in many fields:

> Many research funders are putting policies in place to ensure that datasets judged to be potentially useful to others are curated in ways that allow discovery, access and re-use. But there is not a perfect match between cultural norms in some research disciplines and funder requirements. Some disciplines are well ahead of funding bodies in that they have had a culture of sharing data for a long time and have developed the infrastructures and methods for doing this. In other disciplines, data sharing is not commonplace and therefore funder policies may imply significant modifications to researchers' attitudes and behaviour." (Research Information Network, 2008, p. 12)

As an example of a research area where funding agency policies and scholarly practices do not yet mesh, a biological anthropologist at the University of Illinois reports that he is trying to figure out how to best comply with the U.S. National Science Foundation's (NSF) strong encouragement to include a data sharing plan in grant applications. While he had previously self-archived his data on a server in his lab and shared it informally among his graduate students and a small circle of colleagues, the thought of someone pulling the plug on the local server has long been worrisome. He is eager for assistance as he begins to explore the options for a systematic and robust approach to sharing and archiving his research data. He recognizes that a more systematic approach to sharing his data will make his research more prominent, help the field by allowing for knowledge to built incrementally and resolve his concerns about the vulnerability of his local server. Without an established path, however, he is faced with navigating a host of decisions about how and where to deposit his data on an individual, ad hoc

basis. No existing repository maps to his needs: the biometric data falls outside of the Inter-University Consortium for Political and Social Research's (ICPSR) collecting profile (and ICPSR is not known in his field, so data deposited there would not be visible to his colleagues) and none of the existing health-related repositories are well-aligned with his specific needs. Noting that older colleagues in this research area generally do not share their data, he finds himself at the vanguard of a new practice with patchy infrastructure and little to guide him beyond the funder requirements (Personal Communication, Spring 2007).

In contrast, other social science fields have a long established history of sharing research data (Feinberg, Martin and Straff, 1985). Researchers in disciplines like political science and sociology, particularly those engaged in quantitative research, routinely deposit data in large central repositories such as ICPSR, which was founded in 1962 and is now the world's largest archive of digital social science data. Repositories like ICPSR, United Kingdom Data Archive (UKDA), and the Council of European Social Science Data Archives, in turn, have established routines for dealing with ingest, metadata (including a newly updated Data Document Initiative, standard, DDI)^n where n=2, sampling, confidentiality and permissions throughout the data lifecycle. The solutions established by repositories like ICPSR have not been adopted by all social scientists, however, nor are they necessarily suited to the needs of all researchers. Repositories like ICPSR are well-equipped to deal with numeric data collected via survey or census, but there are many other forms of social science data with different infrastructure requirements. Not only do these data come in a wide array of formats (with the attendant technical considerations), they also come from distinctly different epistemological contexts that have implications for confidentiality, contextualization and interpretation of the data.

To Share or Not to Share: Publication and Quality Assurance of Research Data Outputs, reports the results of a large-scale study of data sharing practices in the United Kingdom (Research Information Network, 2008). This project's underlying goal was to "discover what motivates researchers to publish their data and, for those who choose not to, what factors inhibit them" (Research Information Network, 2008, p. 13). They conclude that the "lack of uniformity across different research disciplines in terms of behaviour, policies or needs [means that] any solutions to the problems we identify, therefore, will need to be tailored to the requirements and practices of each individual research discipline. Interdisciplinary research needs especially careful consideration in this light." (Research Information Network, 2008, p.13).

The RIN study found that "there are two main ways of storing and curating data – using large, centralised national or international data centres; or using a distributed array of local data stores (based on or in research institutions, researchers' own resources, or formal publication outlets such as journals)" (Research Information Network 2008, p. 12). Examples of the former mentioned, as discussed above, include ICPSR, United Kingdom Data Archive (UKDA),

and the Council of European Social Science Data Archives. Distributed, ad hoc data sharing includes dissemination via journals (*World Cultures, Economic Modeling*), websites focusing on a particular field (The Paleobiology Database <www. paleodb.org>) or stored on a local or institutional server, or on diskettes, zip-drives or other media, in a researcher's office. Carlson (2006) suggests that there is more data in small, heterogeneous "repositories" (or on zip drives, floppies, etc.) than in centralized repositories. This long tail[3] is one of the biggest challenges facing librarians grappling with data curation and stewardship.

Gutmann et al. (2004) have identified some of the key factors mitigating against the deposition of social science data in a shared repository:

– Reluctance to share data with potential competitors; proprietary attitudes
– Lack of time or expertise to prepare data for sharing
– Confidentiality issues
– Rewards accrue more to new research than to preserving or reusing existing data
– Data producers unaware of where or how to archive data
– Data are forgotten or set aside once funding ends and publications are written

WHAT IS SOCIAL SCIENCE DATA?

Social science data comes in many forms. In a succinct overview of the issues surrounding selection and retention of digital social science data (Gutmann et al., 2004, p. 210) delineate the major types of social science data, while Altman (2008) suggests a slightly different taxonomy (Table 1).

Table 1: What is Social Science Data?

Gutmann et al. 2004	Altman 2008	Additional Types of Data
Survey data: – Categorical or close-ended responses – "Full-text" responses to open-ended questions	Raw measurements Numeric tables Administrative records (& email)	Fieldnotes (Silverman & Parezo, 1995) Texts Models (e.g., *Economic Modeling*)
Nonsurvey data: – Images – Sound – Video – Multimedia, etc.	Video & audio interviews, transcripts, blogs	Artifacts, samples, specimens, other physical objects (Gould & Handler, 1989)

Ranging from abstract models to physical objects, the data types listed in Table 1 provide some indication of the heterogeneity of data sources, but this list is far from exhaustive. Indeed, what counts as data across the social sciences is almost boundless. While physical objects (or even sound and video recordings) may challenge the usual categorization of data as either numerical tables or textual documents, these artifacts are quite familiar to museums, archives and special collections who have established mechanisms for appraising, cataloging and archiving these materials. They are, however, quite distinct from numeric data and present unique challenges in terms of data sharing, storage, and preservation. Clearly, the types of "data" listed in Table 1 will not easily fit into the same container, be it physical or metaphorical.

CASE STUDIES: DATA IN ANTHROPOLOGY, ECONOMICS, AND POPULATION STUDIES

To illustrate the diversity of data types and how data creation and dissemination fits into research and scholarly communications practices, three case studies are examined in depth: anthropology, economics and populations studies.

Anthropology

Anthropology encompasses four distinct subfields: sociocultural, linguistic, archaeological and biological anthropology. The varying foci of these four subfields are united by a holistic approach to the study of humankind, as well as the hallmark of anthropological research – a methodology grounded in fieldwork or direct, in situ, observation. In this respect, anthropologists closely resemble ecologists who also go into "the field" to gather data and whose work is inextricable grounded in a particular place and time. Thus Zimmerman's (2003) insights into data sharing practices among ecologists also pertain to anthropologists:

> Fieldwork performs an important function in shaping ecologists' formal and informal knowledge, which carries over to their reuse of data. The informal knowledge ecologists acquire as collectors of their own data in the field or laboratory plays the most important role in their reuse of data. The secondary use of data on a large scale requires a greater emphasis on standardization, peer review, and quality control, which alters the extent of reliance on informal knowledge. However, a formal system offers only some of the information that scientists require to reuse data, and there is a danger in thinking that informal knowledge is easily replaced and is no longer necessary or important. (Zimmerman 2003, p. 220).

The importance of context and informal knowledge in these fields mean that data are not always easily portable. In addition, issues of pattern and scale come into play when attempting to synthesis data from multiple field sites.

Types of data collected and used by anthropologists include fieldnotes (which may include discursive accounts, censuses, genealogies, taxonomies, lexical compilations, sound recordings, maps, texts or other documents) objects/artifacts, images, spectrographs, samples, or specimens (Silverman and Parezzo, 1995; White, 1991). What counts as data in anthropology is both diverse and particular – virtually anything relevant to a particular human context.

In general, anthropologists (especially sociocultural anthropologists) are not in the habit of sharing their original data beyond a trusted network of colleagues and graduate students. Factors influencing this proprietary attitude toward data include the fact that context and informal knowledge is essential in interpreting the data, as was the case with the ecologists Zimmeramn (2003) studied. In addition, confidentiality (in the case of sociocultural anthropologists working with living informants) and the need to handle material remains with sensitivity and respect (in the case of archaeologists and biological anthropologists) complicates open data sharing. Finally, gathering anthropological data is laborious and time-consuming which can contribute to a strong feeling of personal ownership (Gould and Handler, 1989; White, 1991; Silverman and Parezo, 1995).

Data sharing is becoming increasingly common in archaeological and biological anthropology, mostly in small-scale repositories serving well-defined research areas, such as *ALFRED* (Allele Frequency Database < alfred.med.yale.edu>) and Paleobiology Database <www.paleodb.org>). The *National Archaeological Database* <http://www.nps.gov/history/archeology/tools/nadb.htm> brings together information on archaeological sites on public lands, and may help establish standards and protocols that facilitate sharing data more broadly. It is worth noting that fieldwork in archaeology and biological anthropology is often conducted by a team, necessitating common standards for collecting and recording data, whereas sociocultural anthropologists tend to work solo. Moreover, the primary vehicle of communication among sociocultural anthropologists, the ethnography, inextricably interweaves observation and analysis.This complicates the status of data as something that can be isolated from the interpretive context and then shared in any meaningful way. It is not surprising, then, that sociocultural anthropologists generally do not share data beyond a small circle of close collaborators, with the notable exception of the small community of scholars engaged in cross-cultural research who contribute to repositories like *World Cultures* and *eHRAF* (White, 1991).

Economics

Economists in the academy use data published by local, regional and national governments (Dee, Evans & Murray, 1991), as well as data from financial exchanges and banks. Corporate data is also of interest, but is not generally available in the public domain (Gould & Handler, 1989). Economists are voracious

users of data gathered by others, in clear contrast to anthropologists who almost exclusively rely on data they have gathered themselves through fieldwork. While economists do not generally gather original data, they may generate unique "micro-data" or data disaggregated from large-scale data sets and broken down by finer level detail such as, expenses by household or imports of specific models of cars by income, education level, or neighborhood (Gould & Handler 1989, p. 10-11). They also derive models from data – these models are shared in publications and preprints, and can, themselves, be considered a form of data.

Growing interest in replication led some economics journals to mandate that complete microdatasets be made available in the public domain, and the requisite repository system was developed in cooperation with the NSF and ICPSR starting in the late 1980s. Prior to this, the norm was *not* to share datasets resulting from secondary analysis. Thus economists have long made use of data that was freely available, but it was not until the late 1980s that they began to systematically share the microdata generated through individual analysis (Kane, 1984; Fienberg, Martin & Straf, 1985; Freese, 2007).

But even now, many researchers are *not* in the habit of sharing microdata, especially those files not tied to a published study in a journal that requires data depostion. An economics professor at a small liberal arts institution in the D.C area reports posting his datafiles on his campus course management system to share with his graduate students and stores his archived data on floppies, zip drives and disks of various vintages that can be read on a computer he keeps "somewhere around here, I'm not sure exactly. I think the secretary knows" (personal communication, May 2008).

In economics, as in other fields trying to predict the outcomes of complex phenomena or discern laws or patterns (e.g., physics, atmospheric science), models themselves can be form of data. Indeed, these models are widely published and disseminated in peer-reviewed publications such as *Economic Modeling*,. It is interesting to note that like physics, economics has developed a robust system of disciplinary repositories, including the Social Science Research Network <http://ssrn.com/> and Research Papers in Economics (RePEcN) <http://repec.org/>, where most papers in the field are first published as preprints prior publication in peer-reviewed journal.

Population Studies (Demography)

The field of population studies or demography focuses on fertility, migration, and household composition. Evans (1991) describes population studies as a "bridge discipline that organizes the creative efforts of diverse scholars into large scale data collection." The field is methodologically diverse, involving qualitative as well as quantitative data and drawing together researchers from health and epidemiology, social psychology, anthropology and demography.

Like economists, researchers in population studies make use of data gathered by national governments and international organizations. Commonly used data sets in population studies include the *World Fertility Survey*, *General Social Survey (GSS)* and census data (Gould and Handler, 1989). Researchers in this area may also be involved with data gathering and sampling for large-scale population studies. Demographers, in particular, have a long tradition of data sharing – they both cooperate to gather data to be used for administrative purposes and they share microdata derived from secondary analysis. More complicated, however, is sharing data across these communities of practice involved in population research, which can involve distinct methodological approaches and domain knowledge from areas as diverse as community health, anthropology, and demography (Evans, 1991).

DATA SHARING PRACTICES: A MODEL

The case studies discussed above suggest that the different research practices – how information is gathered, analyzed and communicated – in these three fields form a constellation of factors that shape the data sharing norms in those disciplines. The question then becomes, what are the common patterns shaping these informal and formal practices? Can these patterns be used to better understand the factors likely to influence data sharing norms in different fields? As a first step toward discerning these patterns, I stepped back to take a broader look at the factors defining different disciplinary domains, following Becher's (1989) taxonomy of "knowledge territories." As Parry (2007, p. 18-19) explains:

> According to Becher's (1989) classification, pure science, as exemplified by physics, is described as hard-pure, reflecting the nature of its knowledge base as cumulative, atomistic and concerned with universals, quantities and simplification; resulting in discovery or explanation. The humanities, as exemplified by history, and the pure social sciences, as exemplified by anthropology, are described as soft-pure, being reiterative, holistic (organic, river-like), concerned with particulars, qualities and complication; resulting in understanding and/or interpretation. The technologies, as exemplified by mechanical engineering, are described as hard-applied, being purposive and pragmatic, producing know-how via hard knowledge and concerned with mastery of the physical environment; resulting in products and techniques. The applied social sciences, as exemplified by business studies or education, are described as soft-applied, being functional, utilitarian, producing know-how via soft knowledge, and concerned with the enhancement of professional practice; resulting in protocols and procedures.

Using Becher's (1989) "knowledge territories" as a framework, Figure 1 proposes a model of the factors influencing data sharing writ large.

Figure 1. Data-sharing model mapped to Becher's (1989) classification of "knowledge territories"
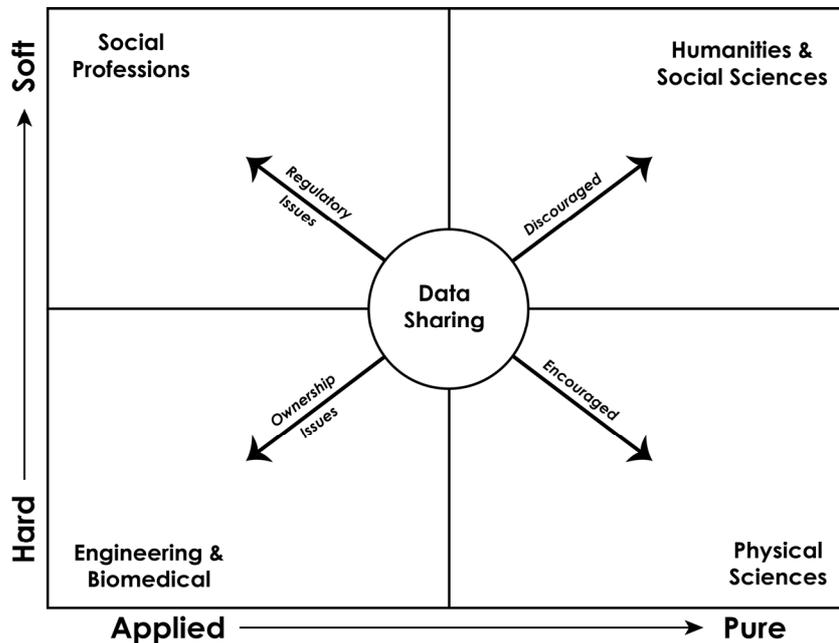
The model proposed in Figure 1 suggests that in the humanities and "pure" social sciences (upper right quadrant), where the goal is to understand the whole of a particular phenomena, the epistemological and methodological framework discourages data-sharing. In contrast, in the physical sciences (lower right quadrant), where the approach is defined as "cumulative, atomistic, and concerned with universals," there are no inherent barriers to data sharing. Engineering and technological sciences (lower left quadrant), which result in products and techniques, bring a concomitant concern about the proprietary aspect of data – issues of ownership, patents, and licensing mitigate against unfettered data sharing. For the applied social sciences like education and social work (upper left quadrant), regulatory issues constrain data sharing, including ethical concerns related to confidentiality and the right to privacy (Etten & Petrone, 1994; Duncan, Jabine & Wolf, 1993). Health and medical researchers also share these concerns. The ubiquity of genetic data and geospatial data, which make it easy to pinpoint individuals, have heightened these concerns (Austin, Harding & McElroy, 2003; Van Wey et al., 2005; Sherman et al., 2007).

Looking specifically at the range of research practices in the social sciences, Figure 2 maps methodological approach (on the horizontal axis) and epistemiological orientation (on the vertical axis) that define the different research prac-

tices in the social sciences to create a model of the factors that influence data sharing norms.

In Figure 2, the left to right axis moves from methodologies involving large-scale, team projects to individual, small-scale (or from research involving work across the disciplines, such as health or economic development, to discipline specific practices such as literary analysis or economic modeling). The top to bottom axis moves from epistemologies involving interpretive, gestalt analysis to comparative studies seeking to uncover regularities or generate predictive algorithms.

The data sharing model for the social sciences (Figure 2) suggests that data sharing is likely to be encouraged in research domains defined by large-scale and/or interdisciplinary studies that seek to generate results that can be generalized through replication or comparison across cases (lower left quadrant). This is in accordance with the case studies of population studies and secondary analysis in economics, in which data sharing and re-use is part of the norms and practices of researchers in these fields. Preceding clockwise, research involving large-scale or interdisciplinary teams and holistic or interpretive analysis poses methodological challenges to data-sharing. Sharing data across research domains is complicated by the importance of implicit or informal knowledge and the inherent difficulty of separating knowledge from the context in which it was also generated limits the portability of data. More to the point, the interpretive frame calls into question the very notion that data can or should be understood in isolation from its particular context. As Zimmerman (2003) found in her study of ecologists, the importance of informal knowledge and issues of scale and pattern present inherent methodological challenges to data sharing. For individual scholars pursuing interpretive analysis in areas like cultural anthropology (upper right), these issues are even more prominent. Within the humanities tradition of the individual scholar, data sharing is an unfamiliar concept and the interpretive frame resists the reduction of knowledge to data elements or data points that can be isolated. Such decontextualization is anathema to scholars working in this domain. Finally, individual or small-scale research seeking to generate results that can be replicated or generalized, or to create models with predictive value, faces logistical challenges to data sharing. The methodology generates data that is portable, but as we saw with economic modeling, sharing data requires a system of scholarly communication that encourages individual researchers to incorporate data deposition into their workflows. In this case, the barriers are technical rather than cultural and data sharing can easily be facilitated by creating the requisite infrastructure. This is in contrast to the upper half of the diagram, in which the obstacles to data sharing are intrinsic to the way knowledge is constructed and communicated in these fields.

Figure 2. Factors Affecting Data-sharing Norms in the Social Sciences
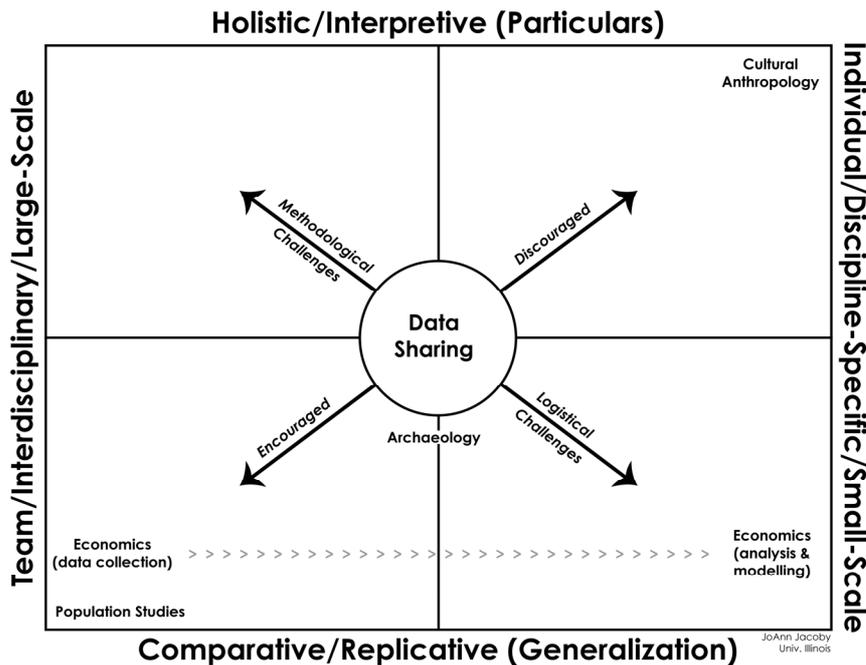
DATA SHARING ACROSS DOMAINS:
ONE SIZE DOES NOT FIT ALL

What implications do these different data-sharing practices have for interdisciplinary scholarship – and for libraries serving researchers across these domains? Sharing data across disciplinary domains where knowledge is built incrementally through replicative or comparative studies and that have a similar approach to data collection and analysis present few if any challenges, except those of awareness and discovery, e.g., researchers doing quantitative sociology, demography and political science are all well served by ICPSR. But what of sharing across communities of practice with distinct methodological and epistemological approaches? Or in areas where a more interpretive, gestalt approach to knowledge building pertains?

Schröder (2007, p. 1) cautions, that "large scale data policies may have unplanned effects of homogeneity." According to Schröder, throughout history of science, data were an inextricable part of the research process, all but useless when removed from the context of a particular research trajectory. Similarly, as Zimmerman (2003) found in her study of ecologists, data are not always easy to disaggregate from the process and context in which knowledge is generated.

In a panel discussion on "Data Discovery and Dissemination" at the 2008 International Association for Social Science and Information Service and Technology Conference (IASSIST), Myron Gutmann (2008) discussed the "fear of miscegenation" as variables from one data set are recombined with other in "mash-ups" for meta-analysis. Not only does this challenge some assumptions about methodology and rigor, but it also presents new challenges as the variables circulate independently and in novel combinations. Who then owns the recombined dataset? How do you cite and track sources? Can we develop provenance metadata and citation standards for variable-level data–and promulgate these standards so that they are actually used?

Parsons and Duerr (2005, p. 32) offer some cogent insights into the need to balance the paradoxical imperative to "maintain data and documentation in a way that facilitates broad but appropriate use so that it continues to be useful to specific group of users, but can also be used by other, perhaps unanticipated user communities with very different needs and ways of approaching analysis." Drawing on Lakoff and Johnson's (1980) work on importance of metaphor as a basis for conceptual understanding, Parsons and Duerr (2005) call attention to how easily terms and concepts can be misunderstood when transplanted from one context to another. The example they discuss is the term "metal" which in astronomy denotes any substance with an atomic weight heavier than hydrogen, which includes oxygen, carbon, and other materials not considered to be metal in the common definition. Another example is "animal," which, for zoologists includes distinctly non-furry creatures like rotifers and nematodes. Perhaps more relevant to the present discussion is "race" which to demographers evoke a discrete category with a precise definition, while biological anthropologists might argue that race is cultural invention that masks a fluid range of biological variation across populations. As (Parsons and Duerr 2005, p. 32) argue, "these metaphors vary from discipline to discipline and are bound to change over time, even within a given discipline…[therefore] we must challenge our assumptions regarding the knowledge of our user community and provide suitable context for users to understand the data."

A recent study of the research behaviors of scientists and graduate students at the University of Minnesota (Marcus et al., 2007) found that the lack of a shared vocabulary was one of the primary challenges to interdisciplinary collaborations. But the real barrier may run deeper than terminological differences to the deep semantic knowledge that underlies the different terms, a less easily resolved challenge.

As Zimmerman (2003) concludes, formal structures (standard research methods, metadata, storage formats) alone are *not sufficient* for large-scale data integration:

> Standard research methods, metadata standards, and common storage formats make it possible to integrate data on a large scale, but this power comes from leaving out information that is necessary to secondary data use. Ecology teaches

us that there are multiple sides to issues of trust, standards, understanding, and judgments about data quality. To be effective vehicles of data sharing, digital libraries and data repositories must capture public and private knowledge and must find ways to document the implicit knowledge that ecologists recognize and can articulate.

It is interesting to reflect on the fact that the conditions that foster data sharing also foster collaboration across and among the disciplines. These conditions include a common set of standards (for metadata, systems interoperability, documentation, terminology, etc.) as well as a shared framework for understanding (Lakoff & Johnson, 1980).

The challenge then becomes building repositories that make the implicit explicit and incorporate some means to capture and communicate informal knowledge in ways that researchers in those domains recognize and can articulate. In this regard, librarians may have a key role to play in this discussion. We have long served as envoys, building collections and information discovery mechanisms that balance the needs of multiple audiences and allow people to navigate unfamiliar information terrain. We also have long experience in balancing the need for short-term access with long-term stewardship.

Most social science disciplines support a range of practices from lone researchers doing highly contextualized research, to those doing comparative or predictive studies whose units of analysis can easily be transported to other contexts. The latter have been in the vanguard of developing large-scale data repositories, but what of the former? Does data sharing have any relevance to those whose intellectual work involves directly engaging a corpus of texts and/or artifacts and whose methods generate knowledge that is inextricably grounded in this constellation of texts/artifacts? What is needed, in this case, are ways to assemble a constellation of texts and primary sources, to create repositories that allow scholars to create idiosyncratic collections of texts and, artifacts or other manifestations of the human experience, to interweave commentary and analysis with the primary sources, and to share and recombine these collections in order to answer a particular research question, akin to the "Multidimensional Framework for Academic Support" proposed in the University of Minnesota's Mellon-funded study (University of Minnesota 2006, p. 50) or the American Council of Learned Societies' report of cyberinfrastructure for the humanities and social sciences (2006). Creating this sort of framework is the next challenge for data-sharing in the social sciences.

NOTES

1 SHERPA-JULIET <www.sherpa.ac.uk/juliet> provides an index of the open access policies, including data archiving requirements, of various funding agencies.

2   DDI or "the Data Documentation Initiative is "an international effort to es-
    tablish a standard for technical documentation describing social science data"
    < http://www.ddialliance.org/>. DDI 3.0, a XML-based metadata standard,
    was ratified by the DDI Alliance in May 2008

3   The long tail is a statistical term associated with distribution also known as
    80-20 rule, wherein 80% of the effects are attributable to 20% of the causes
    (e.g., in Pareto's eponymous study, he found that 80% of income in Italy
    went to 20% of the population). The term "Long Tail" (note capitalization)
    was popularized in a 2004 article in Wired magazine (Anderson 2004) to
    describe the business strategy of online retailers of video and book products
    that focus on capturing a niche market and thereby sell a wide assortment of
    items in small quantities to a large number of people.

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SOCIO-ECONOMIC DATABASES AS A SUPPORT SYSTEM FOR INTERDISCIPLINARY RESEARCH: INDIAN SCENARIO

P. R. Goswami

INTRODUCTION

Globalization as expressed by degrees of economic interaction among countries and economic liberalization are important themes for research in most developing countries. Researchers from non-economic disciplines are trying to measure how these two factors have affected inequality (and also poverty) at the national and regional level. In India, a country with many languages, castes, religions as well as many customs, rituals and traditions, development is judged from different angles using different sets of quantitative and qualitative data. The pluralist Indian society has also given rise to interdisciplinary research transcending the so-called boundaries of social science disciplines.

Apart from socio-economic issues, the Indian government and its policy making and administrative machinery are required to deal with problems of ethnic, religious, and other differences that often promote militancy and disrupt the rule of law and social order. In order to develop a better understanding of these differences and their social and political implications, ideas are drawn from many sources particularly those belonging to hyphenated social science subjects such as political sociology, and political psychology. It is often said that networks of cross-disciplinary influences are such that they are obliterating the old classification of the social sciences. In fact, there is a movement from the old formal academic disciplines towards new hybrid social sciences.

The purpose of this paper is to familiarize the library and information science (LIS) professionals with the statistical databases that act as a knowledge support system for interdisciplinary research in social sciences. Recent changes made in the Indian statistical system to meet the growing needs of research are also discussed.

SOCIAL SCIENCE RESEARCH: RECENT TRENDS

In India, two kinds of institutional structures are prominent for social science research. They are i) universities wherein research is dispersed across individuals; and ii) research institutes where the model of quantitative research based on empirical evidence has worked successfully for satisfying the criteria of output and accountability (John, 2008). In fact, the social sciences changed

significantly in the years following independence (i.e. 1947). The new Indian states' commitment to economic development through centralized planning and measures to protect socially and economically weaker sections were responsible for creating new areas of social science research. However, prior to independence, British officials, travelers and missionaries collected a considerable quantity of basic information on the cultural diversity and resources of India, its people, ecology, agriculture, land revenue and regional problems. More organized and regular data collection began with the starting of Population Census in 1871, which became more elaborate and regular in the following decades. The Ethnographic Survey of India led to the compilation of *Imperial Gazetteer of India* and many volumes on Indian castes and tribes living in different regions. There was also the Linguistic Survey of India, which provided data on languages and dialects of the country (Srinivas, 1987).

Similarly, Indian states' policy to promote social and economic development and carry forward social welfare to the weaker sections of the society mostly living in rural areas created demand for information. Newly established agencies like the Planning Commission, Indian Statistical Institute (ISI) and other autonomous institutes such as National Council for Applied Economic Research (NCAER) started collecting data through surveys on different socio-economic variables. And a few years later, the Indian government laid the foundation for statistical information systems to assist in planning and policy making. Now India has a well developed statistical system which is an integral part of the State's knowledge base.

STATISTICAL DATABASES : STRUCTURE AND CONTENTS

Researchers in social sciences are avid users of statistical databases. And for them, statistics is not viewed as a purely mathematical discipline isolated from life. It is a practical science whose main concern particularly in developing countries is promotion of human welfare through collection of data and information for planning and implementing various development programmes.

Needless to say, socio-economic data provide vital raw material for research. Statistical literacy, i.e. ability to understand and critically evaluate statistical results is now considered an 'essential qualification' for a researcher. Raw data, graphs, charts, rates, percentages, probabilities, averages, forecasts and trend lines are now considered part of the research process. Time series data on different socio-economic variables and their analysis using various econometric models are utilized for the purpose of resource allocation, for planning in areas like health, agriculture, industry, employment and many other matters. Statistical data on Indian society and economy available at national, state and district level on different variables have their origin in government through three major processes (Goswami, 2001):

- Collection on repetitive basis by official (i.e. government established) statistical agencies through censuses and sample surveys. The examples are Population Census (done every ten years) and Sample Surveys on subjects like employment, health, education, housing conditions, household spending/expenditure etc.
- Collection on continuing basis by government regulatory agencies for administrative purposes by using statistical returns. The examples are Income Tax Statistics, Foreign Trade Statistics, etc. This process is also known as routine collection of data as a by-product of administrative activities of the government.
- Ad-hoc collection of data through surveys for specific purposes by specialized agencies and research institutes as part of their research projects. The examples are surveys conducted by National Council of Applied Economic Research (NCAER), International Institute for Population Science (IIPS) and other autonomous agencies.

There are many statistical agencies in the country, which collect, process and disseminate data on a wide variety of subjects. The statistics wing in the Ministry of Statistics and Programme Implementation (MOSPI) is the apex body in the system. The vision statement of this organization is:

> To be recognised as an efficient apex organization for timely dissemination of reliable and credible statistics consistent with international standards to all users (India, 2007).

One of the major responsibilities of this apex federal body is to coordinate statistical work in the country with the view to identifying gaps in data availability or duplication of statistical work and to suggest necessary remedial measures.

Following is a list of important federal statistical Agencies in India and their databases (Goswami, 2001).

a. Central Statistical Organization (CSO)
   a.1 The CSO is one of the major statistical agencies which function under the direct control of the MOSPI.
   a.2 Major databases developed by the CSO include i) National Accounts Statistics (NAS), ii) Annual Survey of Industries (ASI), iii) Index of Industrial Production (IIP), iv) Economic Census (EC), v) Consumer Price Index for Urban Non-Manual Employees, vi) Energy Statistics, vii) Social statistics.

b. National Sample Survey Organization (NSSO)
   b.1 NSSO is the primary data collection wing of the MOSPI. Data is collected regularly through nation-wide household surveys on various socio-economic subjects.

b.2 In addition, NSSO also collects data for Annual Survey of Industries (ASI) under collection of Statistics Act and Enterprise Surveys as a follow-up of the Economic Census.

b.3 NSSO collects data on rural and urban prices and also plays an important role in the improvement of crop statistics.

c. Registrar General of India (RGI)

c.1 RGI is responsible for conducting population census and registration of births and deaths in the country.

c.2 Census of India is the largest repository of data. It contains data in various forms, which include classification of person by sex and age, marital status, rural/urban residence, educational standard, economic activities etc.

d. Labour Bureau (LB)

d.1 LB is responsible for developing databases on labour and employment.

d.2 Most of the employment data are collected by LB as by product of administration of various labour laws operating in various sectors.

d.3 Data on employment and unemployment of agricultural Labour are collected through Rural Labour Enquiry Survey in collaboration with NSSO.

e. Reserve Bank of India (RBI)

e.1 The RBI is responsible for developing database on banking and finance.

e.2 The RBI also conducts ad-hoc surveys on banking business particularly in rural areas.

f. Directorate General of Commercial Intelligence and Statistics (DGCIS)

f.1 The DGCIS has created a foreign trade database. The database developed by the DGCIS is basically a by-product of regulatory mechanisms of the government.

g. Directorate of Economics and Statistics (DES), Ministry of Agriculture

g.1 DES is the apex body for agriculture statistics in India, The collection of agriculture statistics is the responsibility of the states. Database pertaining to area and yield and 'crop estimation' surveys are conducted by the states.

g.2 Agricultural census is conducted every five years. Livestock census is also coordinated by the DES.

Apart from certain major federal statistical agencies, there are state statistical offices and in many states, there are district statistical offices. On the whole one can say that India has a vast network of statistical agencies and databases pertaining to different socio-economic variables, which are produced in a distributed manner.

STATISTICAL DATABASES : TOWARDS INTERDISCIPLINARY RESEARCH

In the present era of a globalised market economy, release of timely and reliable data on variables that related to i) poverty estimation, ii) human development and particularly iii) impact of globalization and liberalization on the weaker or poorer sections of the society has become imperative. On the demand side, the national statistical system is getting a new group of data users whose varied needs are to be identified and met. And on the supply side, technology is making it possible to provide data in the form of electronic products (CD-ROM, on-line databases etc.)

In India, several new initiatives have been started by the statistical agencies to support interdisciplinary research. They relate to i) expansion in data collection, tabulation and dissemination programmes; ii) new subjects for conducting sample surveys and iii) special surveys to ascertain the present state of education/literacy, health, and other related variables; iv) policy measures, pertaining to release of 'unpublished' 'validated' unit level data to the researchers.

As regards sample surveys, NSSO has expanded its data collection programmes, keeping in view the recommendations of the National Statistical Commission. It says, "Under continuing globalization and liberalization of the Indian Economy, to monitor rapid socio-economic changes, and to meet international spatial data dissemination standards, Government of India would need reliable and timely statistical information on a much large scale than before. NSSO, as the only organization in the government with requisite technical capability and experience would have to take up this responsibility" (Vidwans, 2002).

NSSO has recently released several reports based on *Survey on Household Consumer Expenditure, Employment and Unemployment* (2004-2005). Consumer expenditure data are used for the preparation of estimates of poverty in India. Economists have repeatedly raised the issue of deficiency in NSSO data. It has also been said that there is a need to adjust poverty estimates keeping in view the increased consumption of health and education services by household (Mahendra Dev & Ravi, 2008). On the other hand NSSO has released databases on backward castes and religion making it possible to disaggregate across a range of interlocking social categories based on caste and religion.

Similarly, Population Census of India 2001 has published literacy and work participation data by religion for the first time after independence (i.e. 1947 A.D.). The census data also provides an opportunity to analyse and understand nearly 1,700 religious groups that constitute India's religious and cultural diversity. However, for a detailed analysis, unpublished 'cross-religion' data are to be made available to the researchers (Bhagat, 2004).

National Family Health Surveys (NFHS) conducted in the years 1992-93, 1998-99 and the third phase in 2005–2006 provides valuable demographic and

health information on India. One of the special features of NFHS is the application of quantitative methods and survey techniques to a large number of family health related questions and certain socio-cultural issues, which are normally described in subjective terms. These included questions pertaining to a) fertility, b) family planning and contraceptive practices, c) maternal and child health and mortality, d) nutrition and anaemia, e) sexual behaviour, f) women's empowerment, g) domestic violence (Irudaya Rajan & James, 2007). One of the features of NFHS is its timely publication and wide dissemination of results of state and national level. NFHS datasets are squarely in the public domain and they are not in-house documents meant only for the sponsoring bodies. Moreover, these reports can be taken as a model for 'best practices' in such type of survey methodology and are freely available to scholars. Also, there are special volumes providing information on the sampling design as well as questionnaires used (John, 2008). Easy availability of NFHS reports has led several researchers in India as well as abroad to work extensively on India's demographic diversity and human development issues.

Human development indicators (HDI) is now one of the major concerns of the fast growing developing nations. In India, many states such as Madhya Pradesh (1995, 1998 and 2002), Karnataka (2000), West Bengal (2004), Kerala (2007) have brought out Human Development Reports (HDR); and in several other states HDR is under preparation. A national HDR has been brought out by the Planning Commission in collaboration with the United Nations Development Fund (UNDP). In India, new indicators get invented as new social problems are discovered. Sometimes, it becomes the other way, i.e. the indicators can also accidentally reveal the presence of a social problem. For instance, population census results have shown an alarming declines in sex-ratios within some parts of India, indicating the presence of female infanticide.

Another notable feature of India's socio-economic data system is the National Policy on Dissemination of Statistical Data. According to this policy, the apex body i.e. MOSPI provides validated unit level data to the researchers for their analytical studies. Now a large volume of data generated through various socio-economic surveys, enterprise surveys, economic censuses (i.e. census of unorganized sector), annual survey of industries and other statistical operations are preserved for the users on CD-ROM and other digital media. These data are disseminated to a large number of national and international users on special requests. Technical guidance for the use of basic data and their processing is also given to the users. The Indian government has now decided to create a data warehouse of official statistics to enable the data users to have easy access to published as well as unpublished validated data from one source (India, 2007).

STATISTICAL DATABASES: OTHER ISSUES

In India, there has been a quantum increase in the availability of statistical information after independence. However, the quality of data is often questioned by the researchers. There are wide gaps in data pertaining to the unorganized sector and rural income. Moreover, there is a shortage of qualified researchers who can undertake in depth analysis of income inequality, its trends, determinants, and impact of policy instruments. New sources of knowledge and modes for nuanced understanding of socio-economic processes in a transdisciplinary context are needed to study rural poverty and inequality. A mere quantitative approach is not valid because of its decontextualized nature and general lack of explanatory capacity, suggesting a need for a more anthropological approach to social data analysis and creation.

There are certain other issues that need to be addressed for providing a better 'knowledge base' to interdisciplinary researchers in India.

Decline in Data Collection

As a result of liberalization of the Indian economy, there has been considerable erosion of the statistical system. The dismantling of several regulatory bodies and their procedures, which used to generate economic data on different subjects, has contributed to the decline of the system. The statistical agencies are required to take a fresh look on this matter.

Data Quality

Data for the construction of HDI is generally available at the national level though it may vary in quality, reliability and timeliness. One can encounter serious problem while trying to obtain disaggregated data on human development for women and men, for different ethnic groups, minority communities and others at the level of states and districts. It is only by monitoring trends one can trace progress. Average and macro-level data mark serious inequalities and low levels of achievements. One can also find that much of empirical social science is about the poor and underprivileged – social and economic strata, which is lower than that of the researcher. It is very difficult to get good data on the rich and powerful because they can deny access to researchers and otherwise exercise control over whether and what kind of information to make available (Deshpande, 2006).

Data to Inform Policy

One of the major reasons which contribute to the improvement in the quality of statistical data and their timely release is extensive use of data sets by policy makers in the government and academic researchers. In India, users' feedback has resulted in substantial improvement in various datasets. However, use of

data by policy makers is limited because Indian planners and policy makers are not inclined to base their decisions on statistical evidence. There is an absence of analytic tradition in Indian officialdom.

Data Literacy & Knowledge

The students of economics and other social science disciplines are not exposed to the vast myriad of data sources produced by the statistical system. One of the reasons for this ignorance is the lack of directories and guidebooks on the sources and nature of both official and non-official socio-economic data. Two major publications brought out by the CSO i.e. *Guide to Official Statistics* (1987) and *Statistical System in India* (2002) are not revised regularly. More such 'guide to literature' type of publications are needed for the users of data on the lines of *Directory of International Statistics* published by UN Statistical Office (Dasgupta, 2002).

The users of datasets are required to familiarize themselves on the availability of both published and unpublished data. Regular workshop/seminars in subjects like research methodology are needed to discuss sources of generation, explanatory notes regarding concepts, coverage, time lag and level of aggregation and disaggregation of datasets. Directories and guidebooks are required to understand the content and structure of various socio-economic datasets and also to enhance the utilization of data. In addition, analysis, interpretation and integration of various types of data, facilitate their use by researchers. Of late, Indian statistical agencies have started releasing time-series data on important variables maintaining their consistency and comparability.

EPW Research Foundation, Mumbai, also publishes special statistics series. *Economic & Political Weekly,* the most widely circulated social science periodical in India, also publishes data on various macro-economic and social indicators. The Centre for Monitoring Indian Economy, Mumbai, publishes socio-economic data in a repackaged form in its serial publications.

Another factor, which needs attention, is the indexing of rich data contents of research papers in primary journals. They include field level data collected by the authors and also repackaged data gleaned from primary sources often in a disaggregated form. In the domain of science and technology, the system of preparing data-descriptive research to indicate the data contents of primary scientific literature is known as 'flagging and tagging of data'. Thus, an example of index to statistics is different from an index to statistical publications. *Index to International Statistics* introduced by Congressional Information Service, USA is a distinct example as it provides a comprehensive and up to date index of statistical information published in serials, monographs and reports (Dasgupta, 2002).

On the whole, it can be said that the Indian government has expanded its statistical system to meet the needs of researchers and policy makers. However, it has not paid adequate attention to wider and user-friendly dissemination of sta-

tistical data. An important policy decision taken by the government is to make available validated data through unpublished, including unit/household/establishment level data to the users' community. The unit level data is released after deleting their identification to maintain confidentiality. The impact of this new policy is good, as many agencies have started releasing their data in electronic form with a reduced time lag. Major agencies such as CSO, NSSO, RGI and others have started marketing their datasets and offering unit level data for a fee.

CONCLUDING REMARKS

Globalization and liberalization of the Indian economy has an impact on social science research in India. Transdisciplinary research in social sciences on subjects like i) human welfare measures and their impact on various social, religious and cultural groups; ii) good governance; iii) inclusive growth; iv) civil society movement etc. are gaining importance. Statistical agencies and research organizations are building databases and social indicators to support research on these areas. Regular statistical programmes such as decennial population census and National Sample Survey are expanding their data collection schedules and dissemination programmes to include new subjects.

Needless to say, the spread of markets as a result of globalization has an influence on research agenda of universities, as resources for research in life sciences, medicine, engineering, or economics are abundant while funding for research in philosophy, linguistics, history or literature is severely restricted. In fact, there is a premium on applied research (even in social sciences) and a discount on theoretical research. Moreover, globalization is also working towards harmonization of academic programmes. The professions like law, management, economics, etc. which have a close affinity to social sciences are becoming internationalized (Nayyar, 2007). As a result, their context is more global and less national.

In order to promote global interdisciplinary research, a great deal of data are now available at international levels mostly compiled under the aegis of World Bank, United Nations Statistical Office, International Monetary Fund and others. The problem with the data provided by these bodies is that:

> they are often reconstructed rather than directly observed ...... the reconstruction is often cruder with more guesswork, than analysis. There are enough arbitrariness in these figures to make the purists shrink at the thought of touching such data. Given the scarcity of reliable primary information the purist position can almost lead to abstinence from empirical work altogether (Sen, 2004).

Many international organizations publish a number of data serials and reports providing comparative estimates for different countries of the world. These data series are collected from respective national statistical offices.

One can say that LIS professionals working in social science libraries are required to understand and interpret various data series that are needed to support interdisciplinary research. A carefully designed training workshop to understand the nuances of statistical data collection, tabulation, processing and dissemination; and sources of grey literature (including results of ad-hoc social surveys) would be useful. Such programmes are to be organized in collaboration with stakeholders i.e. users' groups and statistical agencies.

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BIOGRAPHICAL STATEMENT

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DEVELOPING SOCIAL NETWORKS

GOING GLOBAL: FACILITATING GLOBAL RESEARCH AND EDUCATION AT GEORGE MASON UNIVERSITY LIBRARIES

LeRoy LaFleur, Melissa Johnson, and Beth Roszkowski

Across the United States of America, colleges and universities are feeling the pressures of globalization and responding with innovative ways to "internationalize" the curriculum and better educate students to understand the global economy and environment. These developments manifest themselves in different ways at various institutions. In some cases, existing curricula incorporate a more global knowledge base, while in other instances new programs and services are developed to meet the needs of international students and researchers. Additionally, however, some institutions use globalization as an opportunity to re-envision the configuration of university departmental units, to remap the relationships between different academic divisions, and to cross the borders of traditional university structures as well as disciplines.

The academic library, as a partner in the university's teaching and learning activities, must also play a key role in the development of these global initiatives. Academic libraries in particular are uniquely situated at the intersection of scholarship, teaching, and student engagement within their respective institutions. Furthermore, they have a long tradition of selecting and managing research resources across a variety of departments and disciplines. Lastly, libraries often have personnel who are responsible for outreach to specific departments in the university that rarely communicate with one another. This centralizing role, which is both organizational and informational in nature, serves as a real strength to universities which are seeking to effectively integrate both their services and global scholarship throughout the institution.

In this regard, libraries have an opportunity to contribute a more holistic perspective to globalization initiatives than most traditional academic units on their respective campuses. However, while libraries are used to responding to the establishment of new programs, the overarching nature of many university-wide globalization efforts goes beyond the addition of new courses, students, and faculty. When these initiatives are fully realized they may also involve the restructuring of academic departments and curricula as well as new programming and services on the part of university student affairs divisions.

In addition to conducting an assessment of library collections and services, librarians who seek to be proactive in this environment must understand the concepts of globalization and internationalization with regard to their implementation in a university setting.

GLOBALIZATION AND INTERNATIONALIZATION
IN HIGHER EDUCATION

While trends toward the globalization of higher education are relatively understood, the terminology used to discuss and describe their related activities and initiatives are not entirely agreed upon. According to the encyclopedia, *Higher education in the United States*, "'Internationalization' is a term that, applied loosely in a higher education context, describes a trend of institutions, faculty and students developing an increasingly sophisticated understanding of and salient relationships with their counterparts worldwide" (Forest & Kinser, 2002, p. 359). Sometimes referred to as *globalization*, this idea encompasses a variety of efforts on the part of universities to increase the capacity of their students to perform in a global environment. Institutions seeking to internationalize and globalize their campuses often employ a variety of methods to do so, including encouraging international exchanges of students and faculty, prioritizing the establishment of international partnerships and research, and emphasizing a need to further infuse global awareness into the academic curriculum. This topic is not new to higher education, and many advocate that such developments are crucial in order to prepare students to succeed in an increasingly globalized society. *Educating Americans for a world in flux*, a report issued by the American Council on Education in 1995, is particularly notable for its call to arms, highlighting the need for American universities to increase the understanding of global systems amongst students, revamp curricula to reflect the need for international awareness, examine the organizational needs of international education, and develop cooperative opportunities with institutions in other countries among its lists of priorities. In an article entitled "Internationalization of higher education: Motivations and realities," authors Philip Altbach and Jane Knight (2007) address the distinctions between *globalization* and *internationalization*, defining *globalization* as the "economic, political, and societal forces pushing 21st century higher education toward greater international involvement," and *internationalization*, within the context of higher education, as including "the policies and procedures undertaken by academic systems and institutions – and even individuals – to cope with the global academic environment" (p. 290). Their article reviews a variety of motivations for international initiatives in university settings and highlights the significance of competition and strategic advantage in the higher education arena. Author Nelly Stromquist (2007) echoes some of these ideas in the article "Internationalization as a response to globalization," which reviews the distinctions between *internationalism* and *internationalization*. Stromquist posits that while *internationalism* focuses on global issues, learning, and fostering a sense of place in the global community*, internationalization* "refers to greater international presence by the dominant economic and political powers, usually guided by principles of marketing and competition" (p. 82), which is indicative of a more entrepreneurial and capital-

driven approach to these initiatives. In "The global campus," author Beth McMurtrie (2007) highlights the role of business and political leaders in "pressuring colleges to prepare globally competent students" and suggests that a "growing number [of universities] are hiring senior administrators to oversee many international ventures, including research, service, and teaching" (p. A37).

In summary, these articles reveal a situation in which universities are working to take advantage of and to develop opportunities that simultaneously recognize the educational, social, and economic benefits behind international and globalization efforts.

GLOBALIZATION/INTERNATIONALIZATION SUPPORT IN ACADEMIC LIBRARIES

Recognizing the rising interest in global studies, increasingly international curriculum, and the growing diversity of student bodies, academic libraries have responded in kind with services far exceeding traditional inter-library loan or providing off-campus access to online library resources. In 2001 the University of Illinois at Urbana-Champaign identified the need to internationalize both library collections and services and thus established a task force to develop an international strategy for the University Library. The task force examined already existing internationally-aimed library activities, including a strong emphasis on collecting materials from non-English-speaking parts of the world and unique library services such as the Slavic Reference Service and their Mortenson Center visiting librarians program (Wei, Sullivan, Rudasill, & Ford, 2006). But even with the Library's push towards internationalizing collections and services, the task force acknowledged the need to further expand these efforts. To this end, the University Library has investigated the possibility of collaboration with universities in other countries, notably with the University of Toronto, to facilitate sharing expertise and best practices (Wei et al., 2006).

Facing difficulties with aligning the collections and services of separate area libraries in the face of interdisciplinary subject matter, the Penn State University Libraries' Global Studies Group was formed in 1999 to strengthen the ties between individual subject libraries. The group consists of librarians from a variety of subject areas, including Anthropology, Business, Education, Geography, History, International Relations, Music, and Women's Studies, as well as collection specialists in area studies such as African Studies, Asian Studies, Latin American Studies, and Middle Eastern Studies. The group is charged with reviewing international purchasing plans and expanding access to international electronic resources ("About Global Studies," 2007).

GLOBAL RESEARCH AND EDUCATION
AT GEORGE MASON UNIVERSITY

George Mason University has been an entrepreneurial leader in higher education since its inception in 1972, with a history marked by rapid expansion and innovative planning. Mason currently offers 64 undergraduate and 94 graduate degrees while serving a total of 30,000 students between its three campus locations in the metropolitan Washington, DC area. Mason also boasts one of the most diverse student bodies in the nation according to the Princeton Review ("Mason Visitors Center – Mason Facts and Figures," n.d.).

The University recognizes that its students are living and working in an increasingly global society, and thus an emphasis on global education has long been a priority at Mason. A wide-range of academics fostering global understanding has been the end result. Currently, Mason has a strong roster of programs focusing on international and interdisciplinary research, including an undergraduate Global Systems minor offered by the College of Humanities and Social Sciences, undergraduate and graduate degrees from the Institute of Conflict Analysis and Resolution, and master and doctoral programs within the School of Public Policy. Global interests are well represented in each of these programs, whether the emphasis lays in public policy or economics or international relations.

Furthermore, the increasingly diverse nature of academics at Mason has resulted in the creation and growth of interdisciplinary research units, many of which utilize the divergent teaching strengths and research interests of faculty members from across the University. The Center for Global Studies boasts over 100 faculty members from a full range of academic areas; such a diverse roster enables CGS to collaborate with an array of universities, think tanks, and research centers in its active education outreach programs. Similarly, the School of Public Policy supports a variety of research centers, including the Center for Global Policy, the International Center for Applied Studies in Information Technology, and the Office of International Medical Policy. Other successful research ventures include the Center for International Education which has focused on international teaching and language training programs.

In February 2008 Provost Peter N. Sterns announced Mason's "Spire of Excellence" initiative in Global Research and Education in order to further establish the University as a leader in global scholarship. The Global Research and Education committee, headed by the Provost, features faculty appointments from several interdisciplinary academic units, including the School of Public Policy, the Institute for Conflict Analysis and Resolution, the Department of Public and International Affairs, the School of Management, and the College of Education and Human Development. The committee will be responsible for furthering globalization efforts at the University through a variety of tasks which will strengthen Mason's global orientation even further and will benefit

students through increased exposure to international scholarship. Under the guidance of the committee, the Provost intends to hire several new faculty members in the area of Global Studies, establish a new master's program in Global Affairs, launch a professional executive Global Affairs program, and continue to establish and support research institutes.

TRADITIONAL LIBRARY SERVICES WITH "GLOBAL" IMPLICATIONS

Within the George Mason University Libraries there are already a number of services and skill sets at work that support the University's globally-focused efforts. The Libraries are well known and respected for their digital initiatives, most of which are readily accessible to members of the Mason community both on campus and from locations around the world. Even physical materials like books have been taken abroad by students studying in other countries for the semester.

The services listed below are among those offered by the GMU Libraries that serve the duel purpose of reaching a wider, perhaps international, audience while supporting the University's distance education and study abroad programs.

Virtual Reference Services

Mason Librarians serve as subject specialist liaisons to different departments and often receive email reference questions sent directly to them or directed through an online question submission form. Telephone numbers to all reference desks and liaison librarians are readily available to the Mason community. Additionally, GMU Libraries currently offer instant messaging (IM) reference assistance via a Meebo widget linked from the Libraries' homepage. This service is open to all researchers wherever they reside, and the service operates during set hours with shifts rotating amongst librarians.

Web-Based Research Guides and Instructional Materials

Librarians at Mason have developed a number of pathfinders and instructional tools for students and researchers that are available online, such as InfoGuides: subject-specific web guides that provide links to relevant research resources and other library materials online in a user-friendly format. The Libraries also maintain a WebCT course entitled "Library Research Basics Online" which allows students to log in and follow along with a self-paced study of library-related research methods.

Off-Campus Access to Databases and Electronic Journals

GMU Libraries provide access to over 500 databases for students, faculty, and staff. Aside from licensed databases, the Libraries also link to free, credible web resources. Since the resources on the database pages include both licensed and open access items, an icon system has been implemented to give visual cues to researchers demarcating the resources that are freely accessible versus those that are restricted.

eBook Collection

At present the Libraries utilize two eBook packages. NetLibrary supplies the largest portion of Mason's eBook collection with both general collection and reference titles. An additional supplier, Oxford Reference Online, provides a suite of various reference eBooks. Access to eBook content is limited to members of the Mason community.

Digital Archive

The Mason Archival Repository Service (MARS) is a stable, well-managed, permanent archive for digital scholarly and research materials of enduring value produced by Mason faculty, staff, and students. MARS is also the platform for some of the University Libraries' noteworthy digital collections and archives. Electronic Theses and Dissertations (ETDs), for those students who choose to participate, are also stored in MARS.

Collections and Document Delivery Services

Librarians at GMU collect resources in multiple formats and languages, from a variety of domestic and international sources. Librarians from the University have traveled to book fairs in other countries in order to acquire representative materials. Additionally, GMU Libraries provide extensive document delivery services through an intercampus lending system which moves materials between the University's three primary campuses, a consortium loan service which transfers materials among a network of nine colleges in the greater Washington, DC area, and a traditional InterLibrary Loan (ILL) system which provides access to materials in both domestic and international collections. Furthermore, the University has partnerships with both the Library of Congress and the Center for Research Libraries which provide access to in-depth collections of international and foreign language materials to members of the Mason Community. Some of these services include the electronic delivery of articles in addition to physical media.

Collectively these services illustrate some of the tools in place at Mason that work to support the research of domestic and international students and faculty. GMU Libraries, however, must continue to raise awareness of their contribu-

tions to and support for the University's global initiatives. Furthermore, Mason's efforts toward establishing global research and education as a priority for the institution warrants a more structured solution from the Libraries. One approach for accomplishing this was the development of a dedicated web-based information portal for accessing a variety of resources related to international research and study at the University.

Global Research and Education Library Portal

In response to the growing emphasis on global studies at Mason, and taking a cue from the aforementioned initiatives within libraries at other universities, Mason librarians acknowledged the need to enhance our web-based presence and services in order to better collocate and consolidate resources to support the University's new Global Research and Education "Spire of Excellence." The establishment of a library research portal for Global Research and Education has been one of the key developments in this process.

In 2007, Mason's University Librarian called for the development of research portals as a means of better connecting the Libraries' electronic capabilities with the work and needs of the University's graduate research programs. These portals would allow for new ways to tailor services and to organize a subset of the Libraries' electronic resources in support of specific academic units. The development of the Global Education and Research portal, then, stemmed from a combination of interests within the Libraries and the Office of the Provost's work to bring together the University's resources in support of internationally-focused research and teaching.

The portal design team consisted of three librarians with specializations in Global Affairs, Public Policy, and International Relations and a representative from the Libraries' Digital Programs and Systems office. Among the first tasks was the creation of a resource classification scheme for global research that encompasses international subjects with a focus on international affairs, education, and economics – all areas which are prioritized among the Mason community. Following that step, the team then began to identify resources, databases, and websites that would be included in the portal. Additionally, the project team researched different campus programs in order to identify likely beneficiaries of the portal. Work on the portal is currently ongoing and in the future will include meeting with some of the constituent groups mentioned earlier in order to further customize the portal's contents and utility to their specific needs. Additional technical aspects, like whether to include live chat/instant messaging functionality or the best ways to utilize RSS feeds, are currently under discussion.

REFLECTIONS AND CONCLUSIONS

Academic libraries that are seeking to better align themselves with the goals and initiatives of their universities must take a proactive stance in the development of tools and services that promote these interests. To this end, through the establishment of the Global Research and Education portal the George Mason University Libraries have taken a significant step by attempting to anticipate and address the growing need for resources that support the University's new direction for and emphasis on global education. Along the way we have learned a great deal about the needs of this emerging area of practice. For instance, through some of our initial discussions we learned that while most of the involved units were supportive of the Provost's efforts toward globalizing the campus, some were not in full agreement with his methods and approaches to doing so. Furthermore, during the development of the project we also learned that some faculty members had concerns about the ability of the Libraries to support the University's international programming, which perhaps indicates a need for the Libraries to better publicize their efforts along these lines.

Another question that arose during the project was in regards to the long-term support for the research portal. Would the initial team of librarians continue to support the development and maintenance of the portal, or would a more effective approach be to assign those duties to one designated librarian? Most recently, Library Administration announced the creation of a new librarian position with assigned responsibilities for Global Studies, which, in addition to further showcasing the Libraries' support for the University's international initiatives, also presented a potential solution to that concern.

Lastly, the group also considered a variety of next steps that could be taken in order for the Libraries to better support the University's increasingly global dimension. The recent acquisition and implementation of OCLC's Collection Analysis tool may represent yet another avenue in which the University Libraries can play a greater role in facilitating global research and education at George Mason University, by assessing the Libraries' capacity to fully support the global work of the University from the standpoint of its physical collections.

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BIOGRAPHICAL STATEMENT

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NO PASSPORT NEEDED: BORDER CROSSINGS IN THE ACADEMIC LIBRARY

Suzan Alteri and Michael C. Sensiba

For most of their development as disciplines, the social sciences were fragmented, often contested subjects in academia. Their fields of concern – humanity, society, and human relationships with the environment – have placed them in both the humanities and natural sciences camps of the academic world. Indeed, specializations in the broader field of the social sciences did not occur until the Twentieth century, causing a splinter of subject areas that staunchly refused to collaborate with one another. However, this era of retrenchment has ended, and the traditional boundaries between the social sciences have once again become indistinct. Anthropologists and historians are studying the medical field, political scientists are looking at how public policy affects society, and psychologists are working within the framework of medicine, social work, history, the arts, education, and law.

But there is one paramount concern that all the social sciences share: the need for cohesive and manageable information. How do librarians accomplish such a feat when the metaphorical sand is constantly shifting beneath their feet? Emerging technologies such as Web 2.0, social networking software, social tagging, and wikis allow librarians and data gatherers to manage the growing body of knowledge and data while also reaching an ever-changing and increasingly technologically savvy clientele. By using these emerging technologies, libraries can create "one-stop shops" that allow scholars and students to acquire and deposit information related to the social sciences as well as communicate with each other to further global scholarship.

This paper explores the planning and creation of one emerging technology – a social sciences vertical portal (vortal) – at Wayne State University, and how this vortal fosters and supports research communities by discussing the areas crucial to the vortal's success: content, audience, usability, awareness, and assessment.

As the academic world becomes increasingly global and integrated, traditional boundaries between disciplines are quickly disappearing. Thus, the need for cohesive and manageable information that traverses academic disciplines is paramount to the success of any research project. Since 1997, *portal* has been the buzzword of the networked age (Zhou, 2003, 120). However, librarians and scholars are beginning to address the idea of storing, sharing, and managing mass amounts of digital information. As early as 1945, with Vannevar Bush's discussion of his Memex machine, a machine he conceived to store, gather, and organize information that would replace the library of his day, to the development of the National Library of Medicine's IAIMS (Integrated Academic Information Management System) in 1983, knowledge management has been on the minds of computer scientists and engineers.

While historically libraries have been viewed as physical storehouses of information, consumers now require the library to be a digital storehouse as well. "Ever increasing user demand for value-added digital resources and enabling navigation assistance requires innovative thinking that enhances traditional physical reference service strategies with new web-based solutions" (Somerville & Vuotto, 2005, 77). Therefore, the library must reach beyond the building and even beyond its primary clientele to form a broad base of knowledge management that is available to scholars worldwide. Such a transformation, however, also means challenges: "The Internet has gone through many changes. Old tools have been adapted and reconfigured; and new tools are constantly being developed. The question of how to organize Web sites so users can actually find what they are looking for is a continuing problem" (Williamson, 2007, 330).

Scholars of information science believe they have solved this problem with the use of what has been termed a *portal*, though a precise definition remains nebulous. Indeed, gateways, portals, and even vertical portals can all be synonymous with one another in various aspects. A portal can be simply defined as, "a gateway to the Web that allows the plethora of information on Internet and Intranet Web sites to be organized and customized through a single entry point" (Van Brakel, 2003, 594). M. Vijayakumar and A. Ganesan (2006) take this definition a step further, stating that resources should be "high-quality and evaluated" (214). Marieke Guy (2005) also provides a rather simplistic definition of a *portal*: "Portals are aggregators of third party content that present end users with a tailored view of the Web within a particular subject area" (58). As aggregators of information, portals can provide more detailed research guidance and outline essential resources and techniques.

While these definitions give a broad view of the portal, they fail to address the myriad of possibilities that these gateways can offer. More developed explanations of portals address customization, communication, access, and collation. Geoff Butters (2003) defined a portal as,

> A networked service that brings together content from diverse distributed resources using technologies such as cross-searching, harvesting, and alerting, and collates this into an amalgamated form for presentation to the user. … For users, a portal is a possibly personalized single point of access where searching can be carried out across one or more than one resource and the amalgamated results viewed. Information may also be presented via other means, for example, alerting services and conference listings or links to e-prints and learning materials (1).

Butters (2003) continued to explain that a portal, by gathering information into a single access point, helps the user avoid being overwhelmed by info glut, or being lost on the web (2).

Others define portals along similar aspects. Andy Powell described a portal not only as a single point of access but as an online service that supports the user in more than one task: research, communication, learning, and resource

discovery (Miller, 2003, 2). Another scholar defines a portal within the currency of information it provides, its ability to locate highly relevant information, and a powerful search engine with instant access to full-text (Letha, 2006, 11). Moreover, it allows librarians to "switch to a more proactive, user-centered, and service-oriented model of library" (Letha, 2006, 12).

Most libraries now use portals as a means to inform patrons about resources, upcoming news, staff directories, subject guides, and to access resources such as e-journals and databases. In the social sciences, portals have also been used to manage knowledge. In the United Kingdom, the Social Science Information Gateway (SOSIG) has been in use since 1994. This portal aimed to tame the Internet by "providing a quality-controlled directory of Web sites related to social science students, lecturers, and researchers in the UK" (Huxley & Joyce, 2004, 328). Visitors to the site can create their own account to manage information, talk with other scholars, receive training, and search a wealth of resources related to the various social science disciplines. The creators of the site decided the best way to push the information out was to join the United Kingdom's Resource Discovery Network, "a collaborative organization of subject-specialist gateway services called hubs" (Huxley & Joyce, 2004, 329). But the authors pointed out that, with regards to the social sciences, a generalized model of user information behavior is difficult to achieve (329). Therefore, evolution and evaluation of the site has to be an ongoing, cyclical process. Moreover, because the social sciences have been fragmented in the past, and now cater to divergent needs, there is a strong "need for cohesive and integrative information services to help overcome these issues" (Huxley & Joyce, 2004, 331).

At Wayne State University, which serves a diverse population of undergraduates, graduate students, professionals, scholars, faculty, and distance learners, the need for an integrated site with value-added services, such as providing access to information not readily available through the university library system (gray literature, conference proceedings, and professional association literature), in addition to the various workings of departments and faculty members that fall under the umbrella of the social sciences, was seen as crucial to the success of grant-funded interdisciplinary research. It was decided that the best way to try and reach this dispersed audience was to create a type of portal, known as a *vertical portal* (vortal).

Vortals are narrower in definition than a portal because they are subject-specific. "Vortals are used for information on a specific topic, but the information contained is of a more variant nature and is usually for people who have a deep interest in and professional knowledge of a particular field" (Vijayakumar & Ganesan, 2006, 214). What differentiates the vortal from a portal is that it centers information on a specific theme or audience and seeks "depth rather than breadth, aiming to present all the information of interest to some subset of the public" (Van Brakel, 2003, 595). Vortals can allow for a range of services:

connection to users with the best materials and services, convenient personalized services, access to subject gateways of different topics, digital reference service, and web-based user education. Due to the wide array of interactive assistance the vortal can provide to the university community, and even beyond the walls of academia, it remains the best option for librarians and libraries to reach a diverse and growing clientele of researchers. As the social sciences represent the largest aspect of academic librarianship at Wayne State University, library system professionals saw it as the perfect subject area to pilot a portal project in the hope of engaging students and scholars with respect to interdisciplinary research, thus furthering the mission of the university as a whole.

Wayne State University is a large, urban university located in the heart of Detroit's cultural center. In addition to the regular library services the university provides to students, there are also the colleges of medicine and law, both of which are integrated into the university library system. With such a large and diverse student body and faculty, the university has grappled with how to better reach and service social science faculty, researchers, students, and those disciplines that are now crossing academic boundaries such as psychiatry, medicine, and law. A majority of the university's students are commuters, which the university serves through its eight distance learning centers as well as an array of online course offerings. Not only are students and some faculty living across the state, but many also come from Toledo, Ohio, Windsor, Canada and the surrounding areas. The vortal is the means by which the library system hopes to reach this varied and scattered clientele, some of whom never set foot on the main campus during their degree program.

The primary objective of the vortal is to bring the branches of the social science community together in a virtual space to foster collaboration, research, and scholarly communication. The vortal provides a means by which to deliver the increasingly important gray literature of the academic world and "born-digital" content. In addition, the site correlates non-traditional sources of information for many social science disciplines, particularly important in the collection of social science data. By mixing old technologies with newer, emerging ones, the vortal is a virtual space for the Wayne State social science community, and those engaging in interdisciplinary research, for both work and discussion.

The project team consisted of the social sciences librarian; the next generation librarian, who deals with emerging technologies and users; and a library system web developer. The first step the team focused on was determining the crucial steps for success in the initial phase of the project. The team decided to concentrate on five steps; three centered on planning and implementation, two on post-creation:

– What type of content should be included and why?
– Who will be the audience?
– How will usability be determined?

    – How will we create awareness for this campus resource?
    – How will the resource be evaluated and assessed?

The content of the site was determined by the social sciences librarian. She compiled resources from both inside and outside the university, including library and departmental home pages, other university sites, and Web sites containing grey literature and material from professional associations. The audience included students, undergraduate, graduate, in addition to distance learners, faculty, and outside researchers. In determining usability, the team decided to look at various free or open source programs that users already have familiarity with, and are widely available on the Internet. The team decided not to create or purchase software for the university for the first phase of the program. Web server space on the Wayne State University Library System's computers is a precious commodity, and the team thought it best to attempt this type of access at a later stage in the project. In terms of programs, the team reviewed five possibilities: blogs, wikis, subject guide software, social networking software, and web office suites (e.g., Zoho). The programs were analyzed for the following components: ease of use, ease of creation, capabilities, space, pricing (if applicable), and any other advantages/disadvantages.

After reviewing the five different program options, the team decided a wiki would best suit the first phase of the project. Wikis allow for an informal communication mode, which Hobohm (1999) had deemed important in his study on social science information gathering: "The informal communication mode has become increasingly important with the development of the Internet. The Internet, often described as the big communication machine, gives direct and rapid access to institutions and persons." (180). Moreover, information contained in a wiki can also aid social science practitioners and researchers in citation chaining, another important means of gathering information in the social sciences.

A wiki is a readable and writeable program that has the potential to allow visitors to create new pages and modify existing ones. It has the capability of pushing out ample information that is easily and constantly changeable, and it allows for users to discuss research through the use of forums. In addition, wikis allow personalization, as Farrell (2006) pointed out: "A wiki supports an organic evolution of the structure and content of the site based on the dynamics of the individuals in the community" (2). This open nature fosters a sense of ownership and empowerment not only among creators, but also among participants thus securing buy-in from scholars. Besides their ability to foster communication, wikis can also become knowledge bases as they "are used to collaboratively contribute to a collection of documents that capture knowledge"

Table 1: Analysis of Software for Vortal Development

Type of Software	Capabilities	Ease of Use	Ease of Creation	Space	Price	Pros/Cons
Blogs	Web site created and updated by one person with added comments and readability	High. Readers can read and post comments to a post.	Very. Created by one person or a team using programs like Blogger or Wordpress.	Unlimited. Allows for archiving of earlier posts	Free	Easy to use and create, but only allows one person/ or admin team to post information. Comments can be added to a particular post only.
Wikis	Web site that is readable and writeable and also allows for discussion forums, knowledge management and user editable content.	Relatively easy to use as more become familiar with wiki technology.	Very easy through programs like Wetpaint, which walk you through step-by-step.	Varies. There is a limited amount of space for free and then creators must pay for more.	Depends on size of wiki, but relatively low.	Easy to use and create. Allows for knowledge management, discussion forums, and attachments.
Subject Guide	Allows creator to organize information and lead users to other sites	Easy. Users are very familiar with this technology.	Easy to create with program.	Unlimited, but long pages are difficult for users	Free	Easy to use and create, but only allows for knowledge management. No collaboration.
Social Networking	Web site that allows a group of people to discuss specific topics and network	Easy, but requires a lot from users in terms of input.	Easy to create with program.	Unlimited	Free	Allows for a great deal of networking and collaboration, but little knowledge management.
Web Office Tools	A suite of programs that creators can use to create a site. Programs range from document and spreadsheet creators to chat functions	Relatively easy to use, but as a suite of programs can be difficult if one is unfamiliar with a particular program	Relative. Creation requires a suite of programs to be put together and administered	Limited	Free to education	Allows a great deal of functions, but not much in way of collaboration. Requires a great deal of managing.

(Farrell, 2006, 4). On the administration side, wikis allow for user and site management so that the library can maintain control and quality over the site.

After deciding to use a wiki, the team then focused on determining which wiki program would best suit the needs of the Wayne State social science community. The team chose Wetpaint, a free wiki creation program that has a sophisticated look along with an array of features important for the vortal's success:

– Page level discussion threads
– Ad free
– Lockable pages
– Site statistics
– RSS and email updates
– Social networking features
– Widgets
– Clickable keyword tags
– Site search

Once the program had been determined, the social science librarian compiled the information needed for the first phase of the vortal project. Information would be pulled from the Wayne State University library home page, social science data sites, social science bibliographic sites, and professional associations. The vortal would feature recent research from within Wayne State University, recent research from outside the university community, tutorials, new books, subject guides, featured subject descriptions, access to databases and online journals, data sets, a discussion forum, and access to Ask-A-Librarian and other library related services.

With the site search capability of a wiki, the lack of a clear demarcation between disciplines becomes moot. The uniqueness of disciplines in the social sciences is still intact while being prevented from their own downfall, which can be their nebulous, vague nature of study. "In the social sciences this seems to be common: a multitude of schools of thought [that] live quite independently, dealing with the same social problem and very often not coming to a single solution" (Hobohm, 1999, 173).

The original template for the project was created using Apple's iWeb program. This program allowed the social science librarian to arrange the content in a way that was user-friendly. It also illustrated what pages should be hyperlinked and the depth of content allowed for usability. During this planning phase, the social science librarian determined that two separate areas should be created, one for scholars and the other for students. Although there is some overlap between the two areas – particularly in locating resources, tutorials, library services, and the discussion forum – other aspects of the vortal that were important for students were not applicable to faculty and vice versa. The scholar area of the vortal would contain the following pages:

- WSU Research
  - Faculty publications
- Recent Research outside WSU
- WSU Resources
- Internet Resources
- Professional Associations
- Discussion Forum
- Library Services
  - Tutorials

The student area of the vortal would contain areas that are more pertinent for graduate and undergraduate students:

- Subject Guides
  - Course Specific Subject Guides
- WSU Resources
  - WSU Digital Commons (an institutional repository)
- Internet Resources
- New Books
- Featured Subject
- Discussion Forum
- Library Services
  - Tutorials

Even within library services, the scholar and student areas would differ, with the scholar area focusing more on contacting subject liaison librarians and research support and the student area highlighting reference and frequently asked questions. Both areas would have tutorials within the library services section. Tutorials would address how to set up a journal alert, how to set up an RSS feed, how to search social science data sets, how to write a thesis, how to search databases, and determining primary sources, as well as provide links to citation tools. The basic layout of the template is the standardized left-hand navigation bar.

The layout of a wiki is in much the same format except the navigation is both to the left as well as above the page. The wiki also gives more freedom than the iWeb template in terms of discussion forums and discussion threads, and allows for more content to be placed on a page. However, when designing either a web page or a wiki, it is important not to barrage the reader with too much information on a single page. Information should be laid out in a manner that is pleasing to the user and does not contribute to info glut. As seen in the template above, there is a great deal of white space between features and information, and the layout is rather simplistic in nature, allowing for a clean, crisp feel to the vortal that provides easy usability. After designing the template, the social science librarian reviewed it with other team members and, after approval, began to populate the WSU Social Sciences Portal Wiki.

Content for the Wiki that was not already located on the Internet or the library system's web page was compiled into various documents by the social science librarian. This method, although time consuming, allowed the team to better plan for organization along information architecture lines. Portraits of users were created to better ascertain their needs and deliver the necessary content. After creating Word documents, information within them was cut and pasted into the wiki using Wetpaint's edit toolbar.

Most of the information could be contained easily on one page. For those pages that required copious amounts of information to be listed, a separate page was created and the two were hyperlinked. The wiki has a hierarchical structure with a subset of pages falling under the umbrella of the main topic page. For example, the topic heading "Research at WSU" has a subpage entitled "Recent Faculty Publications." The entire site is searchable using Wetpaint's widget tool, which allows for the creation of a site search button.

Once content was loaded into the wiki, the next goal of the team was to make the site visible to faculty and students at Wayne State University. Space on the library homepage is extremely limited and under scrupulous control. The team decided they did not wish to approach the Director of Library and Media Services, who oversees the website, until they had the requisite user statistics to warrant placement in such a prominent place. Thus, the team considered the subject guide page, the digital initiatives page, and the For Faculty and For Students pages as alternate locations. After considerable deliberation, the team decided to place the vortal on both the digital initiatives page and the For Faculty and For Students pages because they were the most highly visible. The library system is working on persistent left-hand navigation on the home page, which would allow pages that are buried to have more visibility. The vortal would then be placed along the left-hand navigation bar.

After the vortal was created and implemented on the digital initiatives page, the team, in conjunction with the library system's marketing advisor devised a plan for promoting the WSU Social Science Portal. Although the portal is in fact a vortal, for marketing and usability purposes it was decided to officially call it a portal since more people understand that particular term. For marketing, the team tried a two-pronged approach. First, the portal was promoted through the library homepage under its "News" tab, which not only highlights digital initiatives, but also other projects and resources available through the library. Also, the team was able to promote the portal campus-wide by putting up a promotional message on all the desktops located in the three main campus libraries, advertising in pipeline – the University's portal for students and faculty, and emails, discussion lists, and fliers to faculty. Advertising the portal through the library homepage, pipeline, and computer desktop's are the best ways to reach students at Wayne State University. To reach the faculty, emails, discussion lists, fliers, and effort by subject liaisons that would make faculty aware of this new tool were also vital.

Assessment of the portal will be an ongoing project. For the first phase of the portal, the team is interested in how many people are aware of the site, how many people have visited the site and the reason for their visit. As the portal becomes more of an integrated part of the library system other assessment opportunities will arise, such as determining if the portal is used to access library resources, how well the communication tools are used, and addressing other needs of scholars/students through feedback questionnaires.

The social sciences represent the largest aspect of academic librarianship outside of medicine and law at Wayne State University. Each social science discipline has separate distinctions, yet each also has the possibility to work in tandem with others to create engaging, multifaceted scholarship. Because the social sciences have the unique ability to traverse academic boundaries, their resources require special care. With the advent of emerging technologies, academic librarians now have the tools to promote the similar and divergent qualities of the social sciences by using these technologies to create a virtual space for research and collaboration.

Wayne State University's solution to disappearing academic boundaries within the social sciences was to create a vortal that would bring the branches of the social science community together to foster collaboration, research, and communication while also providing a means to reach the increasingly important grey literature that is not always formally published. By creating a portal wiki, Wayne State University now has a place where social science scholars from both within and outside the campus can virtually meet, gain access to nontraditional sources of information, and experiment with new research methods all within a safe haven. This haven provides a much-needed means by which to manage information, and make the social sciences more cohesive. Also, by offering active and dynamic services in a virtual environment, Wayne State University hopes to meet user demand for value-added services while also combating information overload.

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BIOGRAPHICAL STATEMENT

Susan Alteri is the Social Sciences Librarian at Wayne State University. Currently, Ms. Alteri is working on supporting and facilitating faculty research through the use of emerging technologies. She works closely with faculty members on instruction, reference, and research support. Previously, she worked at the Walter P. Reuther Archives of Labor and Urban Affairs, where she developed an interactive online exhibit. Her work has been published in the monograph Digital Scholarship and the journal Archival Issues.

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CONCLUSION

DISPERSION AND CONSILIENCE –
FUTURES FOR THE
SOCIAL SCIENCE LIBRARY

Lynne M. Rudasill

> "*The legacy of the Enlightenment is the belief that entirely on our own we can know, and in knowing, understand, and in understanding, choose wisely.*" (Wilson, 1998)

Introduction

In preceding chapters the authors have discussed the nature and prospects of interdisciplinarity, explored related case studies, and introduced a variety of developments regarding datasets, pertinent portals and social networking mechanisms for libraries and librarians supporting the disciplines of the social sciences. We have seen how even such venerable organizations as the British Library and Oxford University are changing to meet the needs of social scientists today and in the future. The discussion of interdisciplinarity is not new, but perhaps it is more meaningful to us as we move into the future of social science librarianship. Here we will review concepts relating to the disciplines and interdisiciplinarity, as well as the way libraries and librarians are supporting changes in scholarly work and knowledge production. We will conclude with some suggestions related to the future of interdisciplinarity in the library.

Dispersion, the Evolution of the Disciplines

We have a good understanding of how categories of knowledge became the disciplines we know today. The growth of knowledge in the 18th and 19th centuries was arguably the driving factor in its differentiation into subject specific disciplines. By the beginning of the 20th century most of the disciplines we refer to today as social sciences were being very distinctly defined. By the 1960s the subject areas and boundaries had been built, and a shared vocabulary had been developed for each discipline. Distinct methodologies favored in the fields had been explored and chosen. With the advent and increasing influence of behaviorism in the social sciences, work moved slowly from description of the structures of society to theories regarding how aspects of society might work. Methodologies moved from structuralist to descriptive to what was hoped to be predictive. Unifying theories such as those sought in the "pure" sciences were wished for in some cases, but were generally viewed as difficult

if not impossible for the study of the social. Additionally, the advent of deconstructionist theory, post-modernism, and post-structuralism seemed to militate against any type of encompassing theory for the social sciences.

Even today the social science disciplines seem to emphasize discovery and resist consolidation. This often makes it appear that the social science disciplines emphasize information at the expense of knowledge. It has been argued that, "social scientists, like medical scientists, have a vast store of factual information and an arsenal of sophisticated statistical techniques for its analysis … Still, it is obvious to even casual inspection that the efforts of social scientists are snarled by disunity and a failure of vision" (Wilson, 1998, p. 198). Larger disciplines split into more and more discrete sub-fields. For example, in the United States, political science is broadly split into American government, comparative politics, international relations, public administration, law, and policy studies to name just the major fields of study. At the same time, as indicated in Knapp's essay, the social sciences are the disciplines that should move most easily into the area of interdisciplinarity, e.g. women's studies, media studies, or even global studies (2010, p. 54).

There are methodological problems in many of these areas that keep interdisciplinary studies from reaching their full potential. According to Lattuca, "… some scholars working in the areas of women's studies, ethnic studies, cultural studies and literary studies the redefinition of knowledge might logically conclude in integrated disciplinary perspectives. However for many feminists, poststructuralists and postmodernists, the redefinition project is about dismantling disciplinary perspectives, not maintaining and integrating them" (2001, p. 15).

The social science library reflects its related disciplines. Associating collections and services with any given subject area is something the librarian is expected to do, and does quite efficiently. Physical units as well as collections and services reflect the unique aspects and needs of different disciplines. It is not uncommon for funds to be segregated and dedicated to specific areas of study. Historically, whenever the community and finances make it possible, resources for distinct areas of study will be set up and segregated from one another. The impetus for this most frequently comes from the teaching and research departments as they work to increase the resources available to their scholars. The discipline of library science, one of the most interdisciplinary from the outset, shares many of these same characteristics.

Commonalities

As Witt notes, disciplines are interested in survival and consolidation and this is expressed by attempts to garner financial support, research support, training for new scholars in the field, as well as supporting the dissemination of the research produced in the discipline (2010). It might be helpful to explore in further detail the commonalities among the social science disciplines.

First, each area of study has articulated very specific methodologies that

support the production of knowledge. Although some areas of agreement exist in the disciplines, some are still disputing the correct methodology for the subject area. The "Perestroika" movement in political science was basically a revolt of the scholars who were writing theoretical and descriptive works, against the scholars whose main emphasis was on modeling, game theory, and inferential statistics. The more traditional scholars were becoming less able to publish in the flagship journal of the primary association for political scientists in the United States. The dispute was largely settled with the publication of a new association journal dedicated to the more traditional researcher and some changes in the leadership of the organization. But methodologies do change, reflecting the changes in the discipline. As an example, comparative politics has moved from descriptive and structuralist work, to more comparative and predictive areas. In taking a page from Derrida and Foucault, the effect of deconstructionism and post-modern approaches has led to the development of critical studies in political science. All along the way, librarians have been capturing and organizing the knowledge that is being produced in this discipline. The increased use of datasets is the most recent challenge to capturing knowledge production from the area.

A second shared element characterizing each of the social sciences is the development of a very specific vocabulary that is used to describe phenomena being studied. The semantics of each of the words used in psychology or education or sociology (or physics or biology for that matter) is reflected in the numerous thesauri that librarians have developed to help lead researchers to the information they seek. In many ways the development of electronic resources for unmediated discovery has been a great boon to interdisciplinary research, freeing the scholar to search by an unbounded vocabulary.

Thirdly, all disciplines are deeply interested in, and dedicated to, training new scholars. Here the scholar is inculcated with the theory, vocabulary, and methodology of his or her chosen field. There is a difference in the research habits of these young scholars from the previous generation. Many of these new and future scholars are strictly of the internet age. This is not to say that they never read books or touch a printed journal, but the way they access resources is vastly different from 15 years ago. They are likely to be more interdisciplinary in their approaches simply because of their exposure to a variety of resources they are aware of, that are not in their specific field. These resources appear in federated search tools, Google Scholar, and many other electronic tools created and supported by librarians.

Next, as members of any modern society, all researchers are competing for scarce resources. There are limited amounts of funding available at any given time. The competition for grants and institutional support is fierce. This discourages a great deal of information sharing and cross-disciplinary work as fiscal silos are built and defended. Libraries, although most of the time thought of as the heart of the university, are not exempt from this competition.

Finally, dissemination of knowledge is closely tied to the structure of disciplines. Dissemination is the way a discipline is explained, justified, and assured. Without publications in peer reviewed journals the members of the disciplines could not justify their continuance. There would be no promotion and tenure, no young scholars to carry on the work, and no academic departments to provide support. The manner in which dissemination takes place is slowly changing, however. Ten years ago it was considered career threatening to publish in an e-only journal. Today's discussions regarding scholarly communications on many campuses frequently revolve around whether to publish in open access journals. Libraries and library administrations seem to be encouraging this type of publication. Often this too is a matter of funding. Open access compared to high priced subscription access is extremely tempting in an era of diminishing resources.

The movement to digital repositories is an important one. The access and dissemination provided by a universal search tool such as Google Scholar is much greater than that found in any suite of subject specific databases. In addition, repositories provide solutions to two questions: what are libraries going to do with all that information, and how can libraries preserve the works of our scholars that are born digital?

Interdisciplinarity, Another Road to Knowledge

Some of the shared aspects of social science disciplines lead to what Wilson refers to as being "shackled by tribal loyalties" or what others refer to as silos or fiefdoms (1998, p. 199). The disciplines, as distinct producers of knowledge, can only deal with small parts of a problem. The advent of studies in globalization and the larger problems encountered in today's society from climate change to financial markets to pandemics to human rights can only be studied with a broader gaze than the individual subject area. Interdisciplinary studies are the key to understanding how six billion people can learn to work and exist together. Interdisciplinarity is key to policy-making and problem-solving. The current justification of intellectual pursuits is less subject driven and more problem driven than ever before. There is a developing tension between the scholar and the problem. "Interdisciplinary approaches arise because of a perceived misfit among need, experience, information, and the structure of knowledge embodied in conventional disciplinary organization" (Klein, 1996, p. 13).

As Knapp has put it, "Disciplines are not a bad thing, but they must be viewed for what they are – a descriptive means of categorizing our knowledge and paths of inquiry" (2010, p. 53). Several definitions of interdisciplinary are found in the preceding chapters of this book. In addition, several concepts surrounding the term have been discussed. The key terms we find of interest are interdisciplinarity and transdisciplinary or integration.

Interdisciplinary studies have been widely discussed at least since the 1970s. The critics of interdisciplinary studies have many arguments against

the practicality and rationality of this type of teaching, let alone this type of scholarship.

In providing a voice as "devil's advocate," Benson argues against interdisciplinary studies for undergraduates. He maintains conceptual confusion regarding the knowledge required, lack of a mature base of knowledge on the part of the student, making more difficult the acquisition of essential disciplinary competence for the student, intellectual shallowness of related courses of interdisciplinary study, and the expense of these courses, which are usually team taught, all work against the concept of undergraduate interdisciplinary learning (1998). In responding to each of these arguments, one of Newel's retorts hits at the heart of both learning and scholarship for interdisciplinary studies. He states, "value comes from getting the students to see the richness of the question and what would be involved in answering it, more than from learning the answer itself" (1998, p. 117).

Dogan argues that interdisciplinarity cannot truly exist for any individual scholar. "It is utopian thinking to master two or more whole disciplines. Given that this implies the ability to be familiar with, and combine, entire disciplines, the idea of interdisciplinary research is illusory" (1996, p. 297-298). Dogan sees whole disciplines as being incapable of working across borders. It is possible in his view, however, for fragments of disciplines, sub-disciplines, to interact and form a type of hybrid (1996).

The strongest argument for interdisciplinarity is the size and scope of the problems that need to be addressed. This reflects cooperation and partnerships as much as it does integration of two or more disciplines. Team creation similar to that discussed by England, both at the scholarly level and in librarianship, is essential to address these larger problems (2010). Most library and information scientists are somewhat less specialized than the users they serve. Librarians tend to work on a more programmatic level, pulling the necessary information from a variety of fields in their quest to provide, if not answers, at least intellectual support for a variety of users. Looking carefully at the impact of librarianship on interdisciplinarity is quite revealing.

Social scientists are large consumers and creators of statistics and have been for some time. Goswami provides us with an excellent example of the impact made by the cooperative relationships between information scientists, scholars, and government in India in creating materials that are available to scholars in diverse disciplines (2010). As Jacoby points out, there are more pressures on scholars to deposit and share data and datasets than ever before (2010). Even though, as Robb has indicated, it is not always easy to find this data, advances are being made (2010). In creating digital repositories that can preserve datasets, the librarian is having a definite impact on the way results of research in the social sciences are being preserved.

The electronic portal to information is probably the most under-recognized, but effective, way in which libraries have impacted interdisiciplinarity. Both of

the articles related to information portals or vortals, show one way in which librarians can bring together different aspects of a variety of disciplines to benefit scholars and students alike. These resources provide access to the standard abstracting and indexing tools for specific subjects, but they go beyond that to provide general news, current awareness products, and much more. In addition, they provide the vocabulary necessary for successful research in any given field. Much like Google Scholar, these portals provide quick basic access to research and publication in the scholar's field and beyond.

The advent of federated searching and Google Scholar has also changed the possibilities for social scientists. Scholars no longer need to bookmark specific databases in their field for searching. They can simply enter their terms into the search engine to find a myriad of resources that apply both directly and peripherally to their areas of interest. It is noted that initially, experienced, older scholars were resistant to federated searching, something their students clamor for, but as new scholars emerge, the thought of specialized databases for specific subject areas may become both archaic and unaffordable. When a common search for two general databases, two citation databases, a number of catalogs, full-text books and book chapters, news resources and more is available, the needs of student and researcher, sociologist, biologist, and humanist are quickly and seamlessly met. This is the case with the Library Gateway at the University of Illinois at Urbana-Champaign. (University Library, 2009) With this tool one can in the case of various databases, when one can use keywords to search four diverse databases in public policy, language, sociology, and geography with the same federated search software and a host of reference resources are available to the researcher. In this way libraries and librarians are responsible for changes in research methodology. We have an influence on the way information is disseminated, on the way our scholars do their work, on the way students learn.

The results of a unique study were published in 2009 relating to the interconnectedness of journals in science. Rather than a citation analysis, the authors performed an analysis of "clickstream" data collected from a massive number of scholarly web portal transactions. The resulting "Map of Science" the researchers developed from nearly a billion recorded transactions "provide a detailed, contemporary view of scientific activity and correct the underrepresentation of the social sciences and humanities that is commonly found in citation data" (Bollen, et al., 2009, p.1). Although these linkages do not prove that the research is necessarily interdisciplinary, they do show the interconnectedness of disciplines from a particular point of view. This should not be a huge surprise to any librarian who has had to assist a faculty member interested in the biology of politics or economics. Both of these fields are in their nascent stage, and will no doubt encounter a great deal of resistance, particularly from the social scientist "tribes." As Wilson has pointed out, "Social scientists by and large spurn the idea of the hierarchical ordering of knowledge that unites

and drives the natural sciences," and "question the very idea of objective knowledge itself" (1999, p. 198-99). It would be interesting to see the results of the methodology used by Bollen, et. al from a social science perspective.

Interdisiciplinarity and the Library

Even as we have been seen as reflections of the disciplines in the past, we now need to move beyond this and become the leaders in the production of knowledge that will light the way for organizational and disciplinary changes. Border crossings are needed. Librarians, long considered the gatekeepers to knowledge, need to provide easier to navigate gateways to knowledge. Robb puts it well arguing that we need to ease the sharing of information rather than passively extolling the virtues of cooperation. We need to create spaces, physical and virtual; organize collections; translate the disciplinary vocabulary; and create training in the processes of discovery and location of interdisciplinary resources (2010).

The problems that need to be solved are much too large to be assigned to any one discipline. Librarianship is in the perfect position to cross boundaries between fiefdoms and bring down the information silos that are slowing the progress of problem solving in this globalized, inter-connected world. Although consilience, the unity of the natural world and all it entails, is not apparent at this point, many scholars will continue to work toward it. Whether or not the scholars currently studying economic biology or those studying biopolitics find answers in the near future, the social science library will be there collecting the materials they need for their endeavors.

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