# Collection Development in an Interdisciplinary Context

by Myoung Chung Wilson and Hendrik Edelman

**A steady erosion of academic disciplinary boundaries and a corresponding increase in interdisciplinary research have occurred. These developments present a mounting but still imperfectly understood challenge for collection development and management in academic libraries. This paper examines interdisciplinary research in an academic library context and reports on a case study.**

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Collection development and management in academic research libraries remains challenging in interdisciplinary fields. Klein argues that because interdisciplinary research is problem-centered whereas universities are discipline-based, universities must adapt their organizational structure to account for the growth of problem-centered research activities.[1] Surprisingly, however, although the largest university component that promotes interdisciplinary research is the research university library, nowhere is the traditional discipline-based university structure more clearly evidenced than in collection development where the selection responsibilities of academic librarians are largely oriented toward academic departments.

Most academic library subject selectors are assigned a subject/discipline area(s) in which they select and maintain a particular collection. This procedure is utilized because allocations for materials budgets are traditionally based on academic departments, with the amount of allocation being based, in turn, on factors such as number of faculty, students, and degrees offered. However, it is a common experience for a selector to receive requests for materials that are rightfully classified in other academic disciplines. Such requests reveal clearly that the process of research as it is actually carried out is not neatly determined by traditional academic borders.

This article was undertaken in order to understand the extent to which interdisciplinary research activities are employed in contemporary scholarship and the implications of such activities for collection development in academic libraries. The purpose of the article is two-fold; to examine the rapidly growing body of literature dealing with interdisciplinary research in the academic library context; and to report on a study that ascertained patterns of interdisciplinary research for faculties at the School of Communication, Information and Library Studies at Rutgers University.

## The Nature and Growth of Interdisciplinary Research

In his lucid essay on the interdisciplinary nature of peace research the economist Kenneth Boulding defined disciplines as intellectual subcultures.[2] He insisted that disciplinary "parcelling," particularly in the social sciences where no discipline looks at society as a whole, tends to ignore important empirical studies. Boulding illustrated this point in the following fashion; "...some empirical studies...seem to fall between the cracks of the disciplines altogether. Hardly anybody studies the sociology of the market, the psychology of price raising, the economics of church..."[3]

In response Boulding attributed his own initial attraction to interdisciplinary research in the following way:

> ...One reaction to this situation has been the attempt to develop an "interdiscipline" of general systems. The general systems movement, which has some intersects with the peace movement, owes a great deal to a biologist, the late Ludwig von Bertalanffy, but its official birth perhaps can be dated from the formation of what was later called the Society for General Systems Research in December of 1954....It so happened that four people who were interested in the problem of theoretical systems with application to more than one discipline (our first definition of general systems) happened to be together at the Center for Advanced Study in the Behavioral Sciences at Stanford (1954-155) found they had a common interest, and decided to form a society. The four founding fathers were Bertalanffy, biologist, Anatol Rapoport, a mathematician, network

and game theorist, Ralph Gerard, a physiologist and myself (Ken Boulding), an economist.[4]

A 1983 UNESCO study defined five stages of interdisciplinarity depending on the balance among the respective disciplines in the research process.[5] Transdisciplinarity was specified as the most advanced stage of cooperation leading to the birth of a new discipline. The stages of interdisciplinarity, cross-disciplinarity, pluri-disciplinarity and multi-disciplinarity were defined on the basis of the degree of usage of specific disciplinary research techniques and the application of particular knowledge bases. This article does not consider the epistomology of interdisciplinary research. Rather, interdisciplinarity is defined inclusively as work that is carried out utilizing insights and techniques from one or more disciplinary sources.

Where the growth of interdisciplinary research in these categories is unrecorded, however, how to measure the growth of such research in any form is a monumental task. Fortunately, for academic librarians, *Dissertation Abstracts International* offers an attractive tool for measuring such growth. Dissertations require research materials that most academic libraries must provide; Their preparation involves both faculty and graduate students, the most research oriented user groups within universities. Consequently, for the purposes of this article, *Dissertation Abstracts International* was used as a preliminary data source for measuring the growth of interdisciplinary activities.

A simple search using the words "interdisciplinary research" produced the following results: during the initial 120 years from 1861 to 1981, 12 dissertations used "interdisciplinary research" in their title or abstract; 11 of these were in the social sciences and one in the geological sciences. In the next 10 years from 1982 to 1992, the search uncovered 47 dissertations; 13 of these were in the sciences and 34 in the social sciences and humanities. The last two years, covering 1993-1995, produced 23 dissertations using the words "interdisciplinary research"; 14 of these were in the social sciences and humanities and 9 in the sciences.

While the limited nature of this search undoubtedly conceals those interdisciplinary dissertations that do not invoke the term "interdisciplinary research" in their title or abstract, the search clearly suggests that the growth of interdisciplinary research in dissertations has accelerated over the last quarter of a century.

In fact, the growth of interdisciplinary research as such is generally undisputed. The greying of disciplinary boundaries has been reaffirmed by a number of studies. For example, Bulick's study on *Structure and Subject Interaction* amply demonstrates interdependency among the social science disciplines.[6] Another survey found that the most common characteristic of four social science disciplines is their heavy reliance on other disciplines.[7] According to this study, some economists draw most often upon statistics, mathematics, and engineering;[8] the field of political science is characterized as being "tremendously fragmented" with political scientists relying on a "huge variety of sources;"[9]; the same study found that psychologists move ever more consistently into science and other social science disciplines;[10] while the inherent interdisciplinary nature of anthropology is continuously reinforced.[11] Some social scientists, in fact, insist that innovation in the social sciences occurs more often and with more important results at the intersection of the disciplines.[12]

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A study that focused on the information needs of humanities scholars also concluded that the most striking trend is the spread of interdisciplinary work into the corners of virtually every humanities discipline.[13] This conclusion contrasts sharply with reports from only 10 years ago that humanistic scholars usually read only journals in their own specialties.[14] In sum, these various surveys confirm that one of the central issues facing research libraries is how to meet the collection and service demands that originate from multidisciplinary research activities. The question at this point, therefore, is, "What are the implications for collection development in academic libraries?"

## Interdisciplinary Research in the Library Context

The trend toward interdisciplinary research, and the need to shape library practices accordingly, has sharpened concern over the configuration of university library collections and services. Miksa has noted that contemporary research has become essentially nondisciplinary; in this view disciplinary structure is simply not a significant issue in the research process.[15] Gibbons et al. posited a fundamental shift from Mode 1 (discipline-based) knowledge production to Mode 2 knowledge production that occurs as the consequence of basic research across disciplinary boundaries.[16] Osburn has argued that the validity of the traditional demarcation of subject responsibilities has blurred due to the increased interdisciplinary nature of research.[17] Martell, addressing the consequences for libraries, has proposed a new "client-centered" organizational model derived, in part, from curricular changes that stress independent study and inter- and multi-disciplinary course work.[18] In fact, in response to the substantial growth of interdisciplinary research activities on university campuses since the early 1970s, academic librarians, in general, have increasingly raised questions about the impact of the growth of interdisciplinary research on library collection patterns, budget allocations, service, usage patterns, and collection location sites.

While an increasing body of literature has thus emerged that has studied interdisciplinary research activities per se,[19] libraries still reflect a discipline-based academic priority by being organized and administered along disciplinary lines. For instance, although humanities collections and services have been consolidated in most universities, many social science, professional, and other special subject collections organized by academic discipline or department still exist. This division along traditional disciplinary lines is especially prevalent in the allocation of resources, notably in the book budget. The continuing division of libraries along traditional disciplinary lines has frequently been likened to a plague that has infected many acquisitions allocation schemes in academic libraries.[20] Consequently, as Metz and Foltin ruefully conclude, the current internal organization of collection development in academic libraries invites the undue perpetuation of collection gaps, particularly in nondisciplinary and interdisciplinary areas.[21]

In response to the issues raised by the increase in interdisciplinary research, recent library studies have critically examined journal usage and circulation records. Gopinath, for example, has presented case analyses of the development of multidisciplinary studies which analyze the input of

different disciplines to the formation of a new subject and the effect of multidisciplinary subjects on knowledge.[22] McGrath, Simon, and Bullard studied the circulation records of books for patterns of disciplinary interdependence, thereby delineating the ethnocentricity of those graduate students oriented solely toward disciplinary focused books.[23] Metz used circulation records to determine patrons' use patterns of subject collections. He showed a high incidence of cross-disciplinary use; based on this finding, he concluded that "strong central libraries may be a powerful centripetal counterforce to the tendencies of academic disciplines to break into non-communicating specialties."[24] Peasegood and Lambert posited that awareness of users' interdisciplinary interests should inform various aspects of academic library policymaking; they advocated that measures of interdisciplinarity be established for collection development and management purposes that are not based on a discipline-oriented schedule.[25]

In 1981, O'Connor and Voos advocated the use of bibliometrics to help librarians assess patterns of authorship and identify core collections for collection management purposes.[26] Increasingly, librarians have used bibliometric methods as collection and assessment tools for interdisciplinary fields; they have helped to identify those core subject disciplines that contribute most to an emerging interdisciplinary field. For example, using the *Science Citation Index*, Wray and Soehner developed a collection assessment for biotechnology, a multidisciplinary field whose literature is derived from a wide range of academic areas.[27]

In 1980 Futas analyzed the fledgling literature on women's studies using the *Women's Studies Abstracts* published from 1972 to 1977.[28] Her analysis of source documents and citation patterns revealed that the largest percentage of articles and documents came from the discipline of psychology. She also showed that while the field of women's studies had had little impact on research in subject disciplines, those same disciplines had impacted women's studies. Futas concluded, therefore, that women's studies belongs firmly among the social sciences.[29] Ten years later Mack conducted a similar study on a limited scale. Specifically, she analyzed *Signs: Journal of Women in Culture and Society*, a premier journal in the field of women's studies, in order to identify subject disciplines that have consistently contributed to the published literature.[30] She corroborated Futas' finding that psychology is still the most heavily referenced discipline by women's studies' researchers while sociology is the second highest. Such identifications, she argued, as Futas had advocated earlier, should guide librarians in the selection of women's studies core journals.[31]

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A number of other explicitly interdisciplinary fields were also analyzed in order to understand better the emerging structure of the new fields or to provide appropriate services for the interdisciplinary research needs of academic libraries. For example, in 1990, Khawam tested whether research in artificial intelligence has established a common interdisciplinary research base. Khawam's findings indicate that no such common base exists; rather there is a loose federation of independent fields drawn from the sciences, the social sciences and the humanities (with scientists being the most parochial in their citation behavior).[32] Allen and Sutton studied the journal and book use patterns of scholars affiliated with an interdisciplinary research institute. They suggest that academic librarians provide information services, including collection building, through an understanding of the intellectual rather than the institutional structure of the user community.[33] For collection management of environmental studies at a multi-library system such as the one at Dartmouth, Defelice and Rinaldo recommend developing a list of the subject terms related to environmental studies that were collected by various subject specific libraries on campus. These subject headings, written into a collection development policy, can be used for selection purposes by librarians located in subject specific libraries.[34]

## Interdisciplinary Research at the School of Communication, Information and Library Studies at Rutgers

The study reported here was conducted in an attempt to investigate the research patterns of an explicitly interdisciplinary group of scholars at Rutgers University. As is true for other public research universities, Rutgers University has developed specialized schools, research institutes and centers, and new academic programs. At Rutgers, however, the problems associated with these developments are compounded by geographic dispersion and by a historical legacy which saw the development of the university from formerly disparate undergraduate colleges and their corresponding libraries. Rutgers, therefore, while sharing the challenges that universities in general experience in managing rapidly developing and overlapping areas of knowledge, must also deal with issues particular to itself.

Most prominent among these from a library perspective is the multiplicity of the collections within an intellectually unified but geographically dispersed library system. In particular, the physical separation of the general humanities and social sciences collections on the New Brunswick campus from a group of specialized science research collections on the Piscataway campus, about five miles apart, creates a real challenge for interdisciplinary approaches to library services.

The School of Communication, Information and Library Studies (SCILS), established in 1982, represents the latest model of academic mergers at Rutgers where a program unites the departments of Communication, Information and Library Studies, and Journalism and Mass Media. Since the merger took place, it is claimed that the learning experience of students and faculty alike has been enriched by the synergy of collaboration and interdisciplinarity that has become the hallmark of the School.[35] The School purports to be a sophisticated laboratory that examines information-related phenomenon from a variety of sources in an attempt to produce an output greater than the sum of its parts.

The publication output of scholars in the fields of communication, and library and information science has been the subject of a number of studies. Varlejs and Dalrymple, for example, analyzed the publications of library school faculty to determine the effect that a school's name might have on output. According to them, a significantly greater amount of informa-

tion science literature was produced by faculty whose school contains the word "information" in its name.[36] Cannon studied the interdisciplinary citation practices of library education faculty. She compared citation patterns of those faculty with a doctorate in library science and those holding doctorates in other subject disciplines. She showed a similarity in citation patterns between these two groups and concluded that library science as a discipline uses an approach similar to other disciplines insofar as faculty research is concerned.[37]

Using network analysis, Rice analyzed citations from 77 core communication, and library and information science journals from 1978 through 1987 to uncover structural evidence of increasing interdependence between the two disciplines. One of his findings indicates increasing cross-disciplinary citations since 1983, particularly from communication research journals.[38] However, while this work supports the conclusion that cross-disciplinary citations have increased, Schement and Borgman assert that any attempt to predict convergence or divergence of research agendas is premature.[39]

Consequently, the aim of our study was not to test the convergence or divergence of three disciplines within SCILS but rather to measure the degree to which the faculty at SCILS reached past their own combined disciplinary identification in carrying out their research. The measurement of this outreach was conducted by analyzing the type of materials that were cited in published work (input) and the subject category of the published work itself (output). The following questions were addressed:

- What areas of knowledge do the SCILS faculty consult?
- In what areas do they publish; what Library of Congress classification is accorded to their output?
- What is the library's collection practices and plans in these and similar areas?

The database for establishing the publication record of the SCILS faculty was derived from a five-year cumulation (1983-1988) of annual surveys of faculty activities, the contents of which are available in machine-readable format from the University Computing Center. This listing, supplemented with a list of dissertations produced during this same time period, form the basis of the output survey. Citations used in these publications were used to establish the input record. Input titles were largely concerned with those works that had been cited as bibliographic references in the form of footnotes and/or bibliographies in carrying out research that led to publication.

Two hundred sixty-three published titles were identified as the combined research output of SCILS faculty and doctoral students. This list consisted of books (monographs and edited volumes), book chapters, articles and dissertations. A total of 1,359 titles (a 10% sample of all citations actually used) were identified as input titles.

The LC classification was used as the common language. The book collections in the Rutgers libraries are cataloged according to this classification; the RLG (the Research Libraries Group) Conspectus, the inventory tool for collection development planning, uses the same classification.

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A total of 1,622 titles were analyzed for both the input and output aspects of the study. Of these, 1,359 titles were input titles, that is, the bibliographic sources that the faculty at SCILS actually used in their published materials. The subject analyses demonstrate that the input materials utilized by the SCILS faculty ranged across the entire 22 LC classification schedule.

Among all of the 22 LC subject headings, the input materials most frequently used by SCILS faculty were from their primary disciplinary subject areas of library science, communication, and journalism. Additionally, a considerable number of input materials were from psychology, the social sciences, and computer science. Among the social science disciplines, social psychology, industrial management (including organizational communication) and general topics in sociology were heavily used. The inauguration of the School's newest interdisciplinary academic program, the Master of Communication and Information Studies (MCIS), may explain the heavy uses of organizational communication and management topics by the SCILS faculty. A high incidence of citations from the materials classified in QA 75-76 occurred reflecting the School's emphasis on information science related research and instruction.

Rutgers' assessment of the Z collection is fairly high; many RLG conspectus clusters in the Z classification have a collecting intensity of 4/4—a comprehensive research level collecting pattern. However, the SCILS faculty used very few of these categories as input materials.

In total, 54% of the input materials used by the SCILS faculty were drawn from the subject areas of primary identification. The remaining 46% were drawn from subject areas not considered "their fields of disciplines;" as a result they were not budgeted for the selector assigned to the School.

The analysis of the total of 263 output titles revealed that approximately 64 % of monographic works authored by this faculty is classified in communication, journalism and library science, 15% in the social sciences; and 6% in education. Two thirds of the journal articles published by SCILS faculty appeared in journals that report on research in communication, journalism, and library and information studies. While materials from psychology, education, computer science, and data processing were extensively used as input materials, few output titles appeared in these categories. This finding indicates that SCILS research has little impact on these fields.

The results of this study did confirm our initial assumption regarding the extent of the interdisciplinary research activities of the SCILS faculty. Considering the fact that the explicit purpose of the School is to foster interdisciplinary research, this percentage is surprisingly lower than the recent cross-citation activities demonstrated in, for example, chemistry.[40] Yet, the fact that 46% of the intellectual endeavor of the SCILS faculty falls outside of their primary disciplinary areas is significant for the selector assigned in this area in establishing selection parameters for this particular faculty.

The direct insights gained from this study are that data such as those collected in this study can aid selectors in constructing a collection profile inclusive of all materials relevant to the research activities of a particular discipline. Utilizing this

profile, selection efforts will not be limited to primary disciplinary materials but rather include those materials that scholars actually use. The SCILS selector needs to track publications in approximately the following ratio: 54% in primary disciplinary materials (e.g., communication, library and information studies, and journalism and mass communication) and 46% in the social sciences, psychology, higher education and data processing. A collection profile constructed using these findings will be a specific use-based profile rather than a general discipline-based one.

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This study identified areas of conflict between primary clientele's usage of a collection and the library's collection assessment statements. For example, the latest RLG conspectus statements indicate the collecting intensity of 4/4 in many subareas of the Z collection at Rutgers. This means that the library collects at a comprehensive research level in these areas. Minimal evidence surfaced showing that this faculty placed these collections in high demand in their research. Further study identifying users of these research collections (for clearly the SCILS faculty for whom the collection is built are not the primary users) should be useful in adjusting the library's collecting intensity.

Additionally, if the data in the SCILS study are representative of other interdisciplinary programs, the fact that the primary location of a substantial amount of the materials used by this faculty and graduate students is housed in other libraries poses a significant problem. Special attention may need to be paid to pragmatic duplication of frequently used materials in addition to the development of efficient bibliographic and document delivery services.

## Conclusion

The intellectual migration of one discipline to another suggests that academic library collection development must increasingly address the fact that materials purchased and cataloged under disciplinary headings no longer serve the needs of particular disciplinary groups. Scholarship has largely moved beyond the confines of single academic areas of inquiry. The consequence has been an explosion of multidisciplinary programs which seek to give academic coherence to this phenomenon and a corresponding need for librarians to meet the organizational challenge which this explosion poses.

Whether collection development is organized vertically (centralized) or horizontally (decentralized), attention must focus on coordination, flexibility and pragmatic decision making.

The increase of interdisciplinary research raises a number of organizational questions about the locus of collection development decision making at both the individual and institutional levels. Institutionally, the decision to allocate book funds has traditionally been based on the size of a particular academic program. In contrast, in an interdisciplinary research environment, decisions about the allocation of funds should be based on the use-patterns of the materials. As a consequence, the circulation records of certain subject groups may well be an important added variable in determining a book budget or in determining the number of multiple copies.

At the individual level selector loyalty to a specific library and audience must be balanced against the needs of interdisciplinary users. Primary constituencies—in the case of the SCILS study, for instance, psychology, computer science, and management—may not always appreciate the "applied" needs of other user groups. Additionally, any subject selector's bias toward a given discipline may be counterbalanced by forming a group of selectors with joint responsibility for allied areas. Selection decisions will then be a group rather than an individual activity.

The emerging information environment does not attenuate the already complex issues of interdisciplinarity. While computers have not yet changed the disciplinary basis of academic organization, Harrison and Stephen predict that computer networking will not only disrupt the existing disciplinary structure based on print technology but also stimulate the development of new research practices.[41]

The networked information environment will serve to both facilitate and inhibit interdisciplinary research. For the development of individual databases and Web sites in the absence of search standards can frustrate a scholar's ability to gain easy access to databases. Computer networking capabilities will, however, facilitate interdisciplinary collaboration. A recent study of the impact of the Internet on scholarly research found that e-mail acts as a nexus joining people or information. Additionally, scholars involved in multidisciplinary work cite network discussion groups and listservs as ready means for gathering information from adjunct fields.[42]

In a recent talk, however, Lynch noted that scholars may face increasing difficulty learning about incompatible systems for gaining access to information.[43] Harrison and Stephen echo this sentiment. According to them, only the most intrepid and persistent of users have penetrated cyberspace on behalf of their disciplines to find out what resources exist and what one needs to know to gain access to them.[44]

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Battin, on the other hand, believes that these developments will not discourage individual scholars. She urged universities to redefine departmental relationships in the age of the information superhighway. Since materials are no longer site-bound, Battin suggested that libraries create superfunds that will allow access and ownership.[45] In short, materials budget allocations based on existing departmental structures will not adequately address collection development issues, particularly in interdisciplinary fields served by networked information. To determine how the pattern of adoption and use of networked information resources by different disciplines will impact on the future of interdisciplinary research requires future research.

For collection development librarians in academic libraries close monitoring of new developments in scholarship, especially as these are translated into formal academic programs, is essential. Through continuing analysis of research patterns, carried out in a variety of contexts (i.e., in

women's studies, environmental studies, peace research, developmental studies, the history of science, artificial intelligence, and global studies) the foundation for academically sound and fiscally responsible collection development and planning will emerge.

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