I T H A K A

ITHAKA REPORT

Ithaka's 2006 Studies of Key Stakeholders in the Digital Transformation in Higher Education

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INTRODUCTION

In the modern era, academia has been faced with unprecedented and ubiquitous change, largely driven by technological developments like the personal computer and the internet. Changing technologies have been accompanied by changes in research habits, scholarly communications patterns, campus roles, and more. These changes offer exciting new opportunities, but also pose significant challenges for those who serve the higher education community. In order to be effective, librarians, information technologists, academic administrators, and others concerned with facilitating research, teaching, and scholarly communication in a changing world must keep up with the complex and evolving needs and attitudes of scholars. For libraries in particular, a deep understanding of the information needs of a scholarly community and how existing services mesh with these needs is essential in order to effectively serve and remain relevant on the modern campus. To succeed in the internet age, libraries must be aware of which traditional roles are no longer needed and which potential roles would be valued, and strategically shift their service offerings to maximize their value to local users. We hope that this document, describing the findings of two large-scale surveys conducted in 2006, will help librarians and others interested in scholarship in the digital world think about these changing needs and prompt consideration of how to best serve faculty in a rapidly changing world.

Since 2000, we have been interested in how new technologies are impacting faculty attitudes and behaviors. First at JSTOR, and subsequently at Ithaka, we have commissioned an outside research firm, Odyssey, to conduct large-scale studies of faculty to learn more about their attitudes toward the transition to an increasingly electronic environment. We conducted these surveys in the fall of 2000, 2003, and 2006.[1] In 2006, we supplemented the faculty research with a study of librarian attitudes and behaviors, asking many of the same questions of librarians that we had been asking of faculty.[2] The 2006 faculty survey generated 4,100 responses and the librarian study, which targeted collection development directors, generated 350 responses.

These detailed surveys have produced many thousands of pages of data. This document presents some of the more interesting findings, in order to share with the community some of the key implications that are emerging from our studies. We believe these findings are suggestive of a number of ways for libraries to exercise leadership in the transition to an increasingly electronic environment, sometimes in collaboration with other like-minded institutions, and we hope they will be useful contextual background for community strategic thinking. This document focuses on identifying differences between respondents based on institutional size and disciplinary divisions.

The present version of this document contains the findings which we think are most relevant to the community at large, but we have a great deal more data and detail than contained herein. This document attempts to balance providing a sufficient level of detail to be useful while remaining sufficiently concise and high-level to be approachable. For those who require a deeper level of detail about these findings, we welcome questions and requests, and for those who would like to undertake their own statistical analyses, our data are available through ICPSR. If there are particular points in this document which you believe would benefit from further clarification or detail, we welcome this feedback and hope to update this document to better match community needs.[3]

[1] In this document, we will primarily focus on data from 2006, often in comparison to data from 2003. Data from 2000 will be used only rarely; because the samples in that study were very differently constructed than in later studies and because of differences in the wording of many questions, it is difficult to directly compare the data from 2000 with more recent data. Unless a finding is specifically noted as coming from 2000 or 2003, it should be assumed that we are referring to 2006 data.
[2] The 2006 studies were co-sponsored by JSTOR and Ithaka's incubated entities Portico, Aluka, and NITLE.
[3] For questions, comments, or requests, please contact us at research@ithaka.org. For the complete faculty dataset, please see http://www.icpsr.umich.edu/cocoon/ICPSR/STUDY/22700.xml; for the complete librarian dataset, please see http://www.icpsr.umich.edu/cocoon/ICPSR/STUDY/22701.xml.

RELATIONSHIP BETWEEN THE LIBRARY AND THE FACULTY

It will be a surprise to no one that when data collected in 2006 are compared with findings from 2000 and 2003, faculty increasingly value electronic resources. At the same time, while they value the library, they perceive themselves to be decreasingly dependent on the library for their research and teaching and they anticipate that dependence to continue to decline in the future. There appears to be growing ambivalence about the campus library.

On the positive side, the vast majority of faculty view the role that librarians play as just as important as it has been in the past. This view is held relatively equally across different sized of institutions, except among faculty at the largest institutions, where it is somewhat less strongly supported (60% of faculty at very large institutions see the librarians' role as just as important as it was in the past, compared to 70% of faculty overall).[4]

But these responses vary by discipline. Humanities faculty generally see the librarian's role as having greater continuing importance than do social scientists, who in turn are more optimistic than scientists.[5] More than 80% of humanities faculty think that the librarians' role remains just as important, but less than 60% of scientists support that opinion – social scientists fall in the middle, at around 70% (see Figure 1). This is representative of a general pattern – humanities scholars generally feel closer ties to libraries, presumably due to their greater research reliance on monographs, archives, and other material not yet widely available in digital formats, while scientists are the least reliant upon traditional library-provided search tools (see Figure 2).

Even within these broad disciplinary groupings, however, there may be substantial variation. While about 80% of sociology faculty feel that the role of librarians is of continuing importance on their campus, only about 30% of economists, also counted among social scientists, agreed with this view. The individual characteristics of a particular discipline, the resources available to it in digital and analog form, and a number of other factors may influence a discipline's relationship to the library.

Changing roles of the library

Over the course of these three surveys, we have tested three "roles" of the library – purchaser, archive and gateway.[6] We have attempted to track how the importance of these three different roles has changed over time. Most highly rated among these roles is that of library as purchaser – faculty don't want to have to pay for scholarly resources, a finding which holds across disciplines and has remained stable over time. There is slightly more variation by discipline in views on the importance of the library's preservation function, but valuation of this role is also uniformly high and has remained static over time. The importance of the role of the library as a gateway for locating information, however, varies more widely and has fallen over time (see Figure 3).

[4] Many questions in both studies asked participants to respond on a ten point Likert scale, often asking them to rate their level of agreement with a statement or rank how important something was to them. In our analyses, we clustered responses into the bottom three (1, 2, 3) representing a negative response, the middle four (4, 5, 6, 7) representing a noncommittal response, and the top three (8, 9, 10) representing a positive response. So, for example, faculty were asked to rate how well a statement like "The role librarians play at this institution is just as important as it has been in the past" describes their point of view on a scale between one ("Not at all") and ten ("Extremely well"); here, approximately 70% of faculty responded 8, 9, or 10, which we describe here as agreeing with this statement.

[5] The discipline clusters included in this study were:

- as humanities, Classics, Art History, History/History of Science, Literature, Music, Philosophy, Religion, and Theater/Drama;
- as social sciences, African Studies, African-American Studies, American Studies, Anthropology/Archaeology, Asian Studies, Business/Finance, Economics, Education, Geography, India Studies, Latin American Studies, Law, Middle Eastern Studies, Political Science, Psychology, Public Policy/Health Policy, Slavic Studies/Russian Studies, Sociology, and Women's Studies;
- and as sciences, Biology/Botany/Ecology/Zoology, Chemistry, Engineering, Geology, Math/Statistics, Physical Sciences, Physics, and Public Health.

[6] The purchaser role was described in the survey by the statement "the library pays for resources I need, from academic journals to books to electronic databases," the archive role by "the library serves as a repository of resources – in other words, it archives, preserves, and keeps track of resources," and the gateway role by "the library is a starting point or 'gateway' for locating information for my research."

The declining importance assigned to the gateway role is cause for concern in general, and especially when considered by discipline. The importance to faculty of this role has decreased across all disciplines since 2003, most significantly among scientists. While almost 80% of humanists rate this role as very important, barely over 50% of scientists do so (see Figure 4). Beyond the differences between these general disciplinary groups, there also exist substantial variations by individual discipline, as demonstrated by the perceptions of economists. Between 2003 and 2006, the percentage of economists indicating they found the library's gateway role to be very important dropped almost fifteen percentage points. In 2006, the percentage of economists who believed this gateway role to be very important was actually below the average level of scientists, falling to 48%.

The decreasing importance of this gateway role to faculty is logical, given the increasing prominence of non-library discovery tools such as Google in the last several years. Since 2003, the number of scholars across disciplines who report starting their research at non-library discovery tools, either a general-purpose search engine or a specific electronic resource, has increased, and the number who report starting in directly library-related venues, either the library building or the library OPAC, has decreased (see Figure 5). Despite the rising popularity of tools like Google, overall, general purpose search engines still slightly trail the OPAC as a starting point for research, and are well behind specific electronic research resources. This overall picture, however, hides a number of variations by discipline; scientists typically prefer non-library resources, while humanists are more enthusiastic users of the library (see Figure 6).

The declining importance of this role to faculty stands in stark contrast to the perceptions of librarians, as shown by our 2006 librarian survey. Although the importance of the library's role as a gateway to faculty is decreasing, rather dramatically in certain fields, over 90% of librarians list this role as very important (see Figure 7), and almost as many – only 5 percentage points less – expect it to remain very important in 5 years. Obviously there is a mismatch in perception here.

Librarians at all sizes of institutions see this gateway role as among their primary goals; this, along with the licensing of electronic resources and maintaining a catalog of their resources, are by far the roles most broadly considered important. They expect most of the roles of the library to rise in importance, or at least hold steady, over the next five years, with some notable exceptions to be found in roles focused on non-digital materials, such as roles relating to traditional print preservation and the maintenance of a local print journal collection, which are expected to decline in importance. There are some variations by institution size. Several roles, most notably the development and maintenance of special collections and several more technical tasks such as the management of datasets, are significantly more important at larger libraries than smaller ones. And unlike smaller libraries, larger libraries view licensing as their single most important activity, with less emphasis put on the gateway and catalog roles (see Figure 8). This may be a sign that leading-edge libraries are beginning to change their priorities to match those of faculty and students. Still, the mismatch in views on the gateway function is a cause for further reflection: if librarians view this function as critical, but faculty in certain disciplines find it to be declining in importance, how can libraries, individually or collectively, strategically realign the services that support the gateway function?

Dependence on the library

Even as libraries plan to adapt, faculty expect to grow even less dependent on the library than they already are. This is the case across disciplinary groupings, although humanities scholars expect to maintain a greater dependence on the library than do social scientists, and both foresee a greater level of sustained dependence than do scientists. Currently, about a third of scientists feel very dependent on libraries, and just over a quarter expect to feel this way in five years. Humanists and social scientists also expect decreasing dependence over the next five years, with less than 40% of humanists and about 30% of

social scientists expecting to feel very dependent in five years – in both cases a drop of about five percentage points from their current levels. Again, there are some substantial differences between individual disciplines in these opinions, presumably based on particular research habits and resource availability. For example, classics scholars generally feel a substantially higher level of dependence on their libraries than do historians. Returning to the example of economics, we can see a plummeting dependence on the library, which has fallen since 2003 even faster than the economists then themselves anticipated, with less than a fifth of economists expecting to be very dependent on their campus library by 2011 (see Figure 9).

Additionally, more scholars at the largest institutions currently feel a significant level of dependence on the library than at smaller institutions, and all expect this pattern to continue into the future. While currently less than 30% of the faculty at very small, small and medium sized schools feel very dependent, and about 25% expect to in five years, over 40% of faculty at large and very large schools currently feel very dependent. Although faculty at large and very large schools also expect decreasing dependence over time, they expect a greater sustained level of dependence than do faculty at smaller schools. One possible explanation for this may be that larger libraries are able to offer a wider range of services, or that smaller schools may be more teaching-oriented.

An explanation for this decreasing perceived dependence seems to be that faculty members are growing somewhat less aware of the library's role in providing the tools and services they use in the virtual environment. In general, humanities scholars more often use tools and services closely linked to the library in their research, such as starting their search at the library itself or the library catalog, while scientists more often use tools and services that, although in some cases paid for by the library, are ultimately accessed through other means (see Figure 6). These characteristics may also vary within these broad disciplinary groups, as individual disciplines may be particularly reliant on specific research methods or resources that dictate the level to which they may be oriented towards digital tools.

Perceptions of a decline in dependence are probably unavoidable as services are increasingly provided remotely, and in some ways these shifting faculty attitudes can be viewed as a sign of library success. One can argue that the library is serving faculty well, providing them with a less mediated research workflow and greater ability to perform their work more quickly and effectively. In the process, however, they may be making their own role less visible. This indicates a challenge facing libraries in the near future – as faculty needs are increasingly met without the direct intermediation of the library, the importance of the library decreases. Libraries must consider ways which they can offer new and innovative services to maintain, or in some cases recapture, the attention and support of faculty.

Figure 1: Percent of faculty agreeing strongly with the statement "Even though faculty have easy access to academic content online, the role librarians play at this institution is just as important as it has been in the past," by discipline.

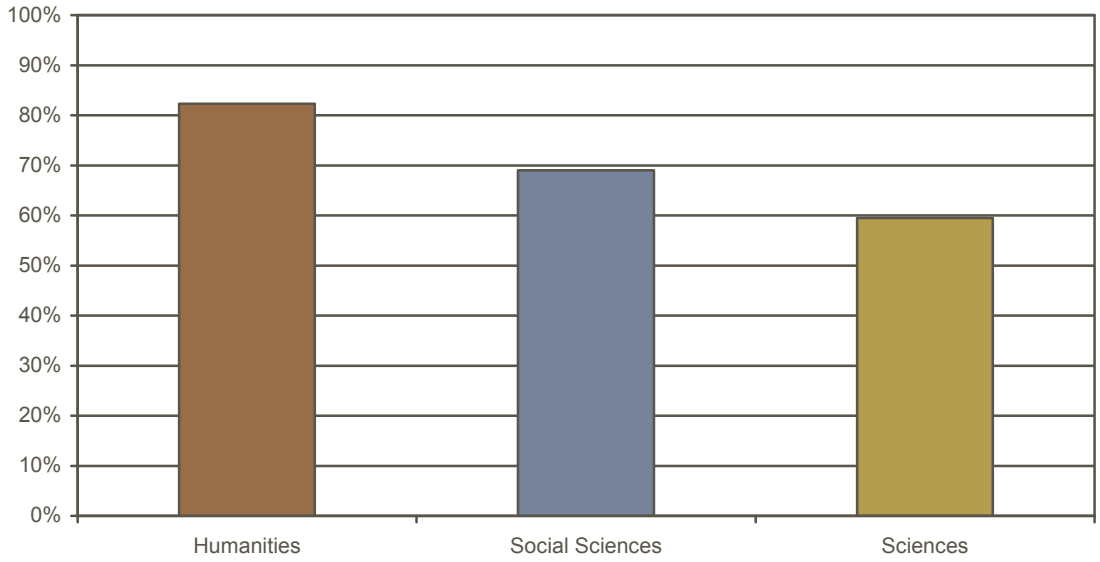


Figure 2: Faculty opinions on the statement "With the advent of digitized books and search tools that are widely available to all users over the Internet, traditional catalogs used by scholars and provided by my library (traditional catalogs, e-catalogs, journal indexing databases, and similar tools) are becoming irrelevant for faculty and students," by discipline.

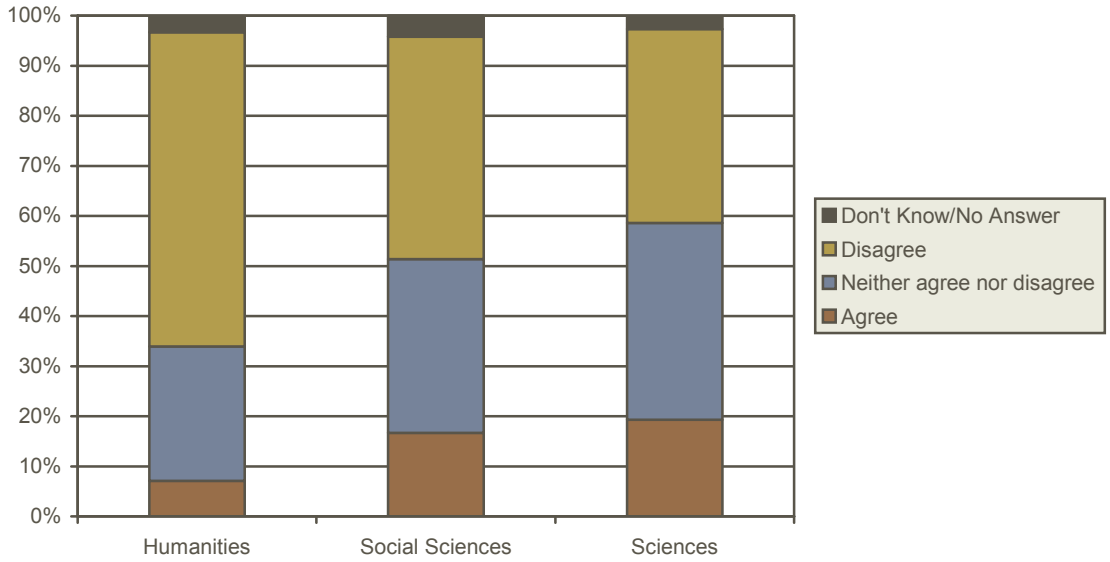


Figure 3: Percent of faculty rating these library roles as "very important," in 2003 and 2006.

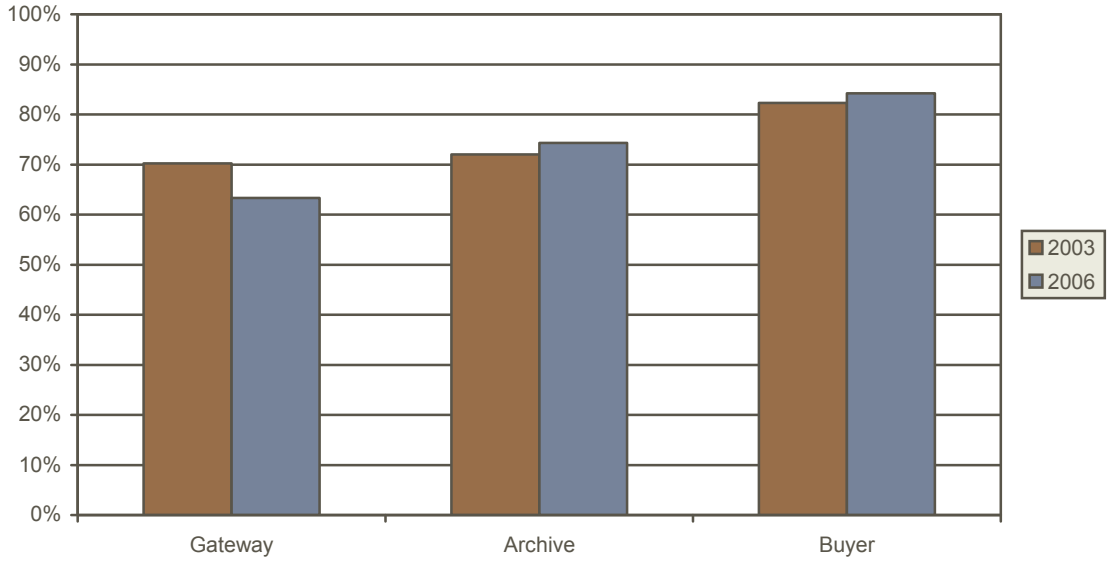


Figure 4: Percent of faculty rating these library roles as "very important," by discipline.

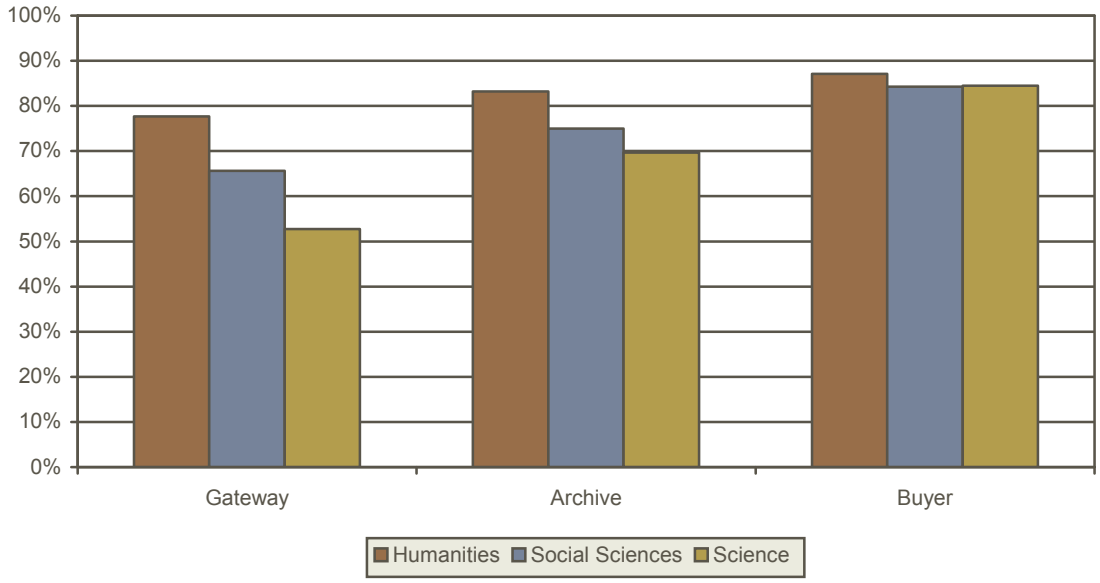


Figure 5: Starting point for research identified by faculty, in 2003 and 2006.

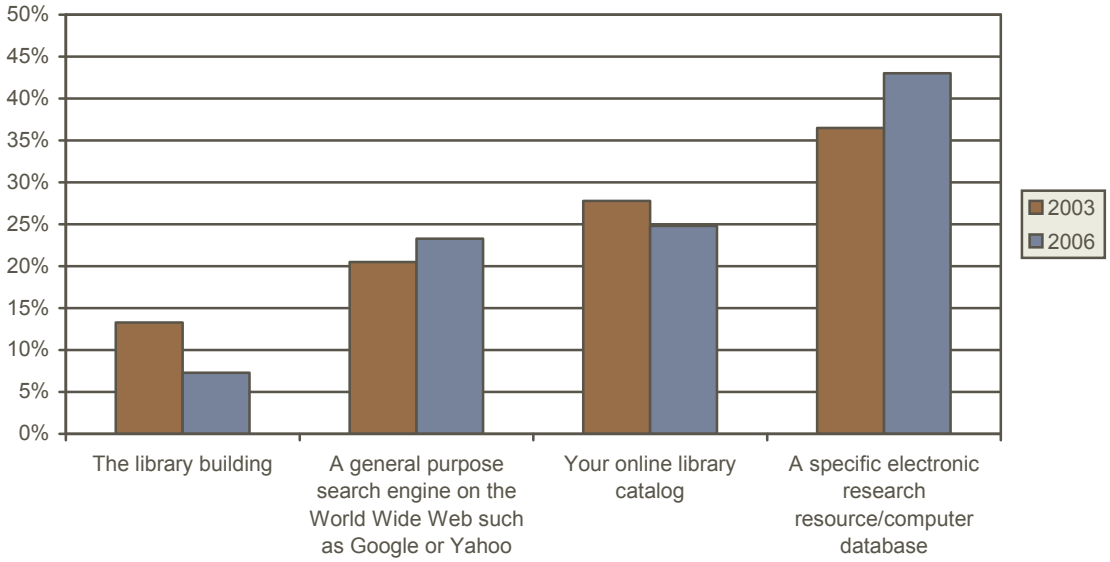


Figure 6: Starting point for research identified by faculty, by discipline.

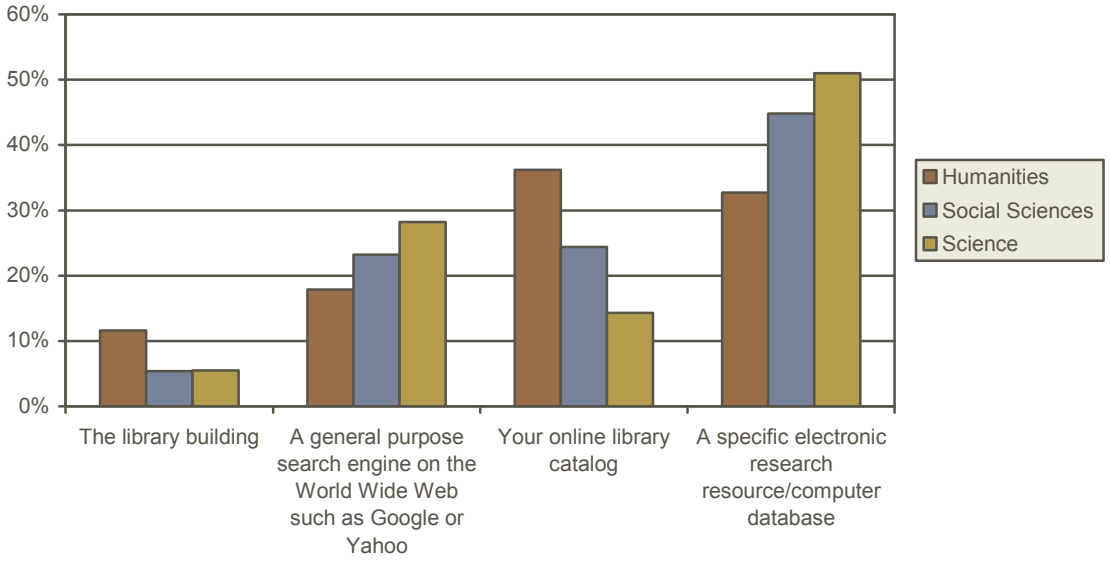


Figure 7: Percent of faculty and librarians rating the function of the library as a gateway for locating scholarly information as "very important," by discipline. 2003 data is not available for librarians.

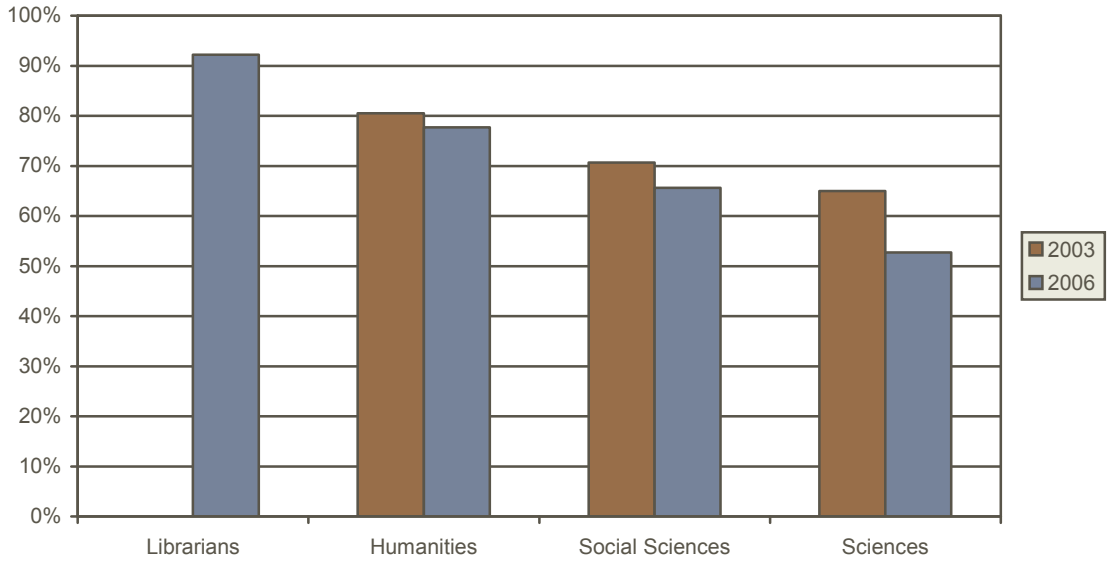


Figure 8: Librarians rating these functions as "very important," by institution size.

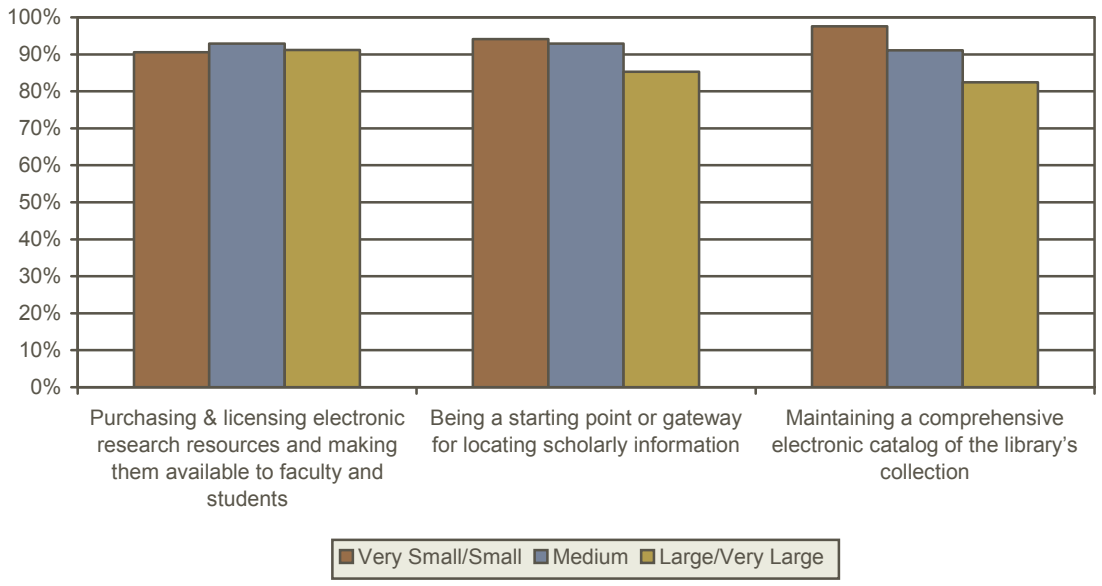
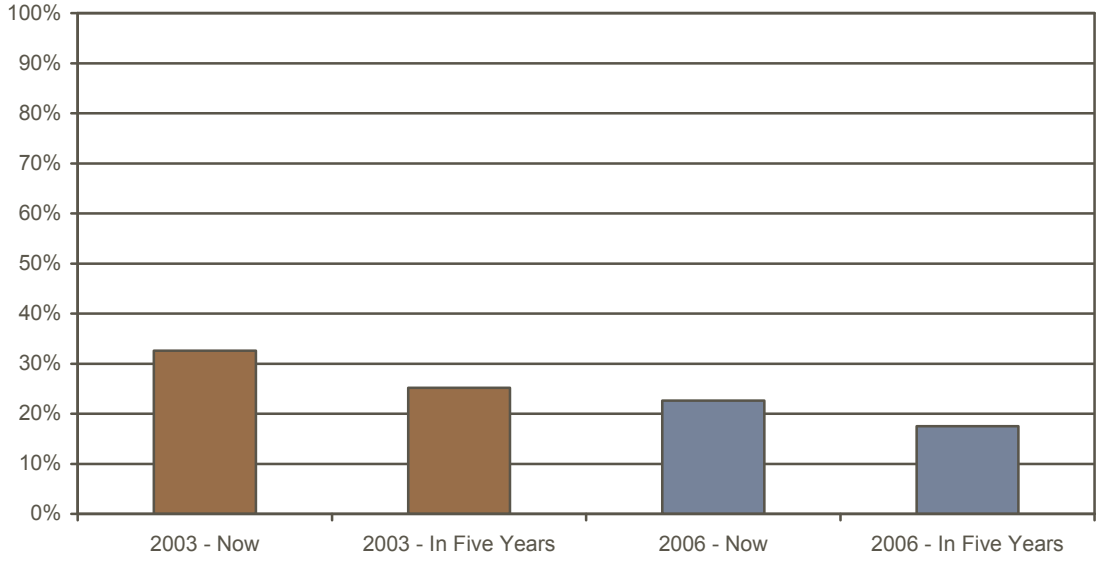


Figure 9: Percent of economics faculty responding very dependent to "How dependent would you say you are on your college or university library for research you conduct?" and "Thinking about five years from now, how dependent do you think you will be on your college or university library for research you conduct?" in 2003 and 2006.



DEPENDENCE ON ELECTRONIC RESOURCES

Across the board, electronic resources are seen to be of great value to faculty, and are expected to grow in importance as time goes on (see Figure 10). This is the case across disciplines, although as might be expected, fewer humanities scholars see electronic resources as particularly valuable and anticipate relatively less dependence on them than do those in other disciplines (see Figure 11). This pattern holds not just for usage of electronic resources, but for general research habits – scientists are particularly uninterested in paper journals, and prefer to do their research online and away from the library, while humanists are relatively more satisfied with traditional hard-copy journals and resources and less frustrated by the need to interact with the library in the course of their research (see Figure 12). In general, these patterns likely arise from the fact that humanities scholars are more reliant on traditional library resources and services than are social scientists or especially scientists. While humanities scholars are still generally included in the trend towards increasing usage of electronic resources, they are less committed than are scientists. From some perspectives, the fundamental differences between disciplines appear to be static, with the impact of new technologies only echoing underlying frameworks. But it is important to recognize that there are many important variables that contribute to the methodological and cultural underpinnings of a given discipline. Some of these variables, such as the digital content and tools available to scholars and students in a discipline, are quite dynamic. Disciplines which are not effectively served by digital resources will reasonably be more interested in the sorts of traditional resources which do effectively serve their needs, but as digital content in their field grows, usage habits may change. These factors may be highly specific to a particular discipline – certain types of scientists may be reliant on particular practices or resources that encourage them to work more or less digitally than do other scientists.

The field of economics is a case in point. Historically, economists behaved much like humanities scholars, and were generally reliant on the library and on printed materials. In the last several years, however, as new tools have become available to them, economists have migrated substantially to the digital. Now, economists are among the disciplines least concerned with maintaining access to paper copies of journals, strongly preferring to do their research online. Over 70% of economists support the idea of their library canceling print journals and only providing electronic access, a rise of over ten percentage points since 2003. Similarly, less that 25% of economists feel that it will always be crucial for their library to maintain a paper collection of journals, a drop of over ten percentage points since 2003. Economics is now one of the disciplines least concerned about maintaining access to print materials, more closely resembling the more extreme scientific disciplines than the humanists. Economists have made a relatively complete conceptual transformation to relying primarily, if not exclusively, on online resources.

This transformation did not require dramatic shifts in practice; traditional practices naturally evolved onto the internet as new structures and technologies supporting this arose. Historically, publishing in peer-reviewed economics journals was a slow process, involving delays of months or years. As a result, there developed a common practice of circulating working papers to more rapidly disseminate research in the field. Journals remained the publication of record and were used in tenure and promotion decisions, but the communicative work of the discipline was largely performed by these working papers. This separation of communications and certification made economics a natural fit for the online world, and economists have enthusiastically adopted tools like RePEc (Research Papers in Economics) and SSRN (the Social Science Research Network) which use the internet to facilitate the exchange of working papers even more efficiently. As these tools have matured, economists found that they could perform their work more efficiently and effectively online than they could in paper, without requiring dramatic changes in behavior or practice.

As different tools built around the needs of scholars in other disciplines arise, similarly rapid shifts to the digital may occur in these other fields. It is important to recognize that generally, scholars do not prefer a certain format simply out of emotional attachment, but because that format allows them to work most effectively and efficiently. As new tools emerge and mature, however, the format which best supports scholarship may shift, and preferences and practices may shift to whichever format best facilitates scholarship. As the case of economics shows us, scholars can shift their medium of choice dramatically and relatively rapidly; other disciplines may follow suit as their ability to effectively research online grows. Libraries should not assume that disciplinary differences will be static, and should seek opportunities to drive change by addressing the challenges which keep certain disciplines paper-oriented.

Figure 10: Percent of faculty strongly agreeing with these statements, in 2000, 2003, and 2006.

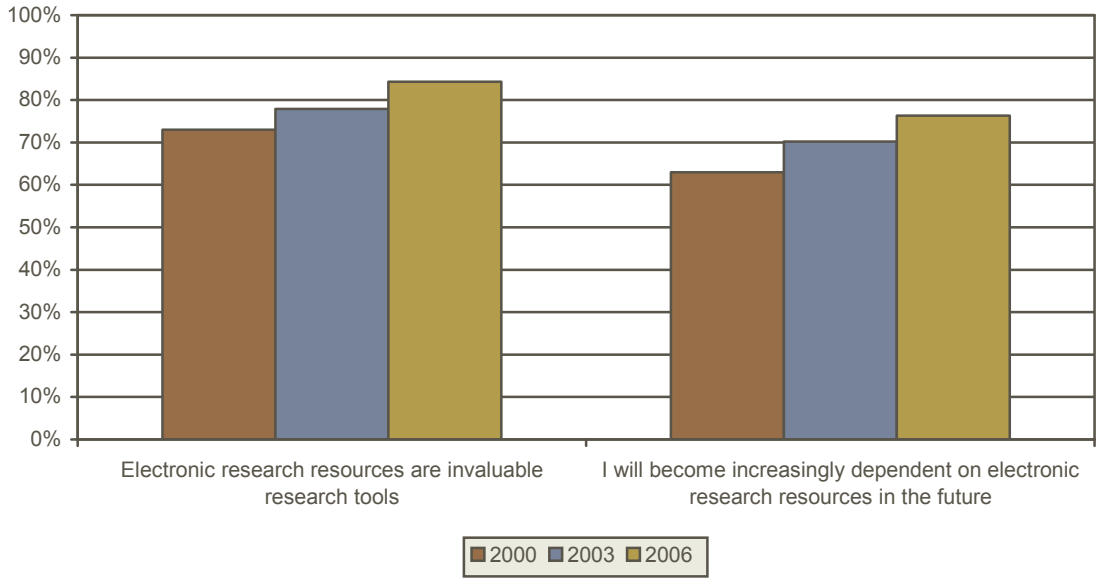


Figure 11: Percent of faculty strongly agreeing with these statements, by discipline.

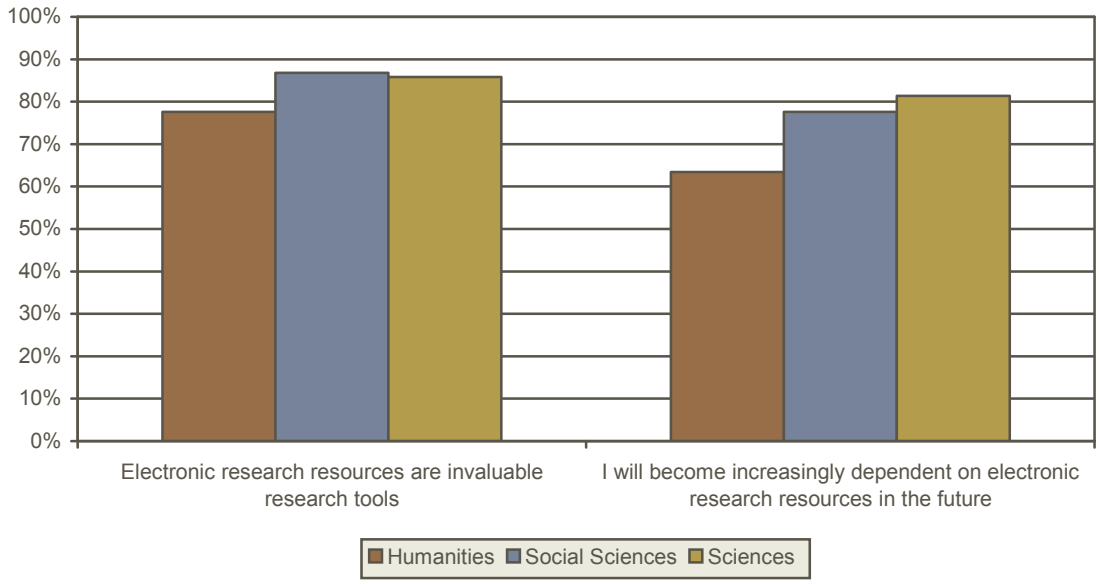
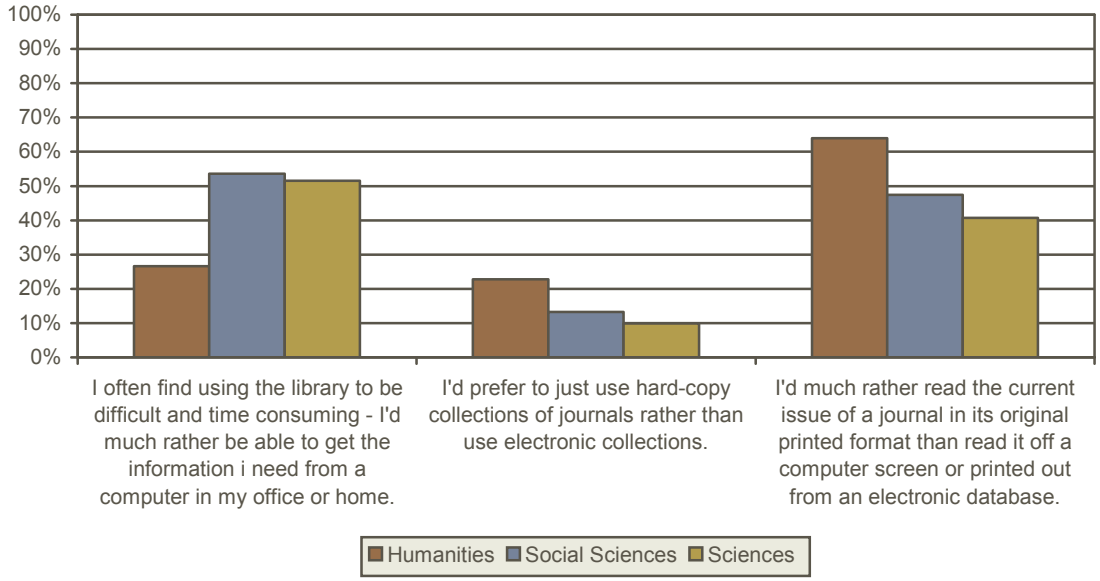


Figure 12: Percent of faculty strongly agreeing with these statements, by discipline.



THE TRANSITION AWAY FROM PRINT FOR SCHOLARLY JOURNALS

One of the most important areas on which this study sheds light is the transition away from print for scholarly journals. This is an area in which an understanding of different disciplinary needs and practices may be invaluable in guiding library response; some disciplines are ready for this transition to take place, but it may not be realistic to expect other disciplines to move online as readily given the current state of electronic research tools available to them. In general, libraries see a number of benefits in encouraging this transition, anticipating space and cost savings. If pursued strategically, this transition indeed may offer substantial benefits, but if approached without a systemic way of ensuring that an appropriate number of copies of important materials are retained for posterity, may prove problematic for the academy.

This transition away from print has been accelerating for some time as libraries cancel the current issues of print journals in favor of electronic formats. The vast majority of libraries cancelled at least some print journals in the two years before our survey because they began a subscription to the electronic version of the journal. Faculty members and librarians are generally prepared to see the library cancel the print-format version of a journal so long as it remains available in electronic format (61% and 63% agree very strongly, respectively).

Neither faculty members nor librarians are enthusiastic to see existing hard-copy collections discarded, with the faculty much less enthusiastic than the librarians (20% and 42%, respectively). These preferences are relatively constant across institutional sizes, but not across disciplines. Humanities scholars are relatively more attached to print journals (although almost 50% of humanists would support their removal given a satisfactory electronic alternative, as opposed to almost 70% of scientists), and are substantially less comfortable with their cancellation or especially the removal from the library of hard copy back issues (see Figure 13). Since 2003, our study saw a decline in the share of faculty members who believe that their local library must maintain hard-copy collections of journals and also a decline in the share who believe that some libraries, but not necessarily their own, must do so. Again, institutional size does not impact this belief, but discipline does. In general, humanities scholars are more conservative, preferring the retention of print collections in general as well as of local print collections (see Figure 14).

As discussed previously, there remain some specific disciplinary differences even among broad disciplinary groups – for example, philosophy scholars are generally less attached to print documents than their colleagues studying classics. We assume that these differences are related to specific disciplinary research methods and resources available, suggesting that researchers are interested in working with whatever are the most effective tools available to them. Certain disciplines may be primarily reliant on print, and thusly place a greater importance on maintaining print contents, because their present research needs may be better met with print resources – electronic alternatives may be lacking or insufficient. As tools evolve, however, these researchers may migrate to digital tools which are better suited to their needs.

For many librarians, digital tools offer a number of advantages entirely aside from their potential research advantages. They may be less expensive or more easily managed, and may offer space savings or decreased administrative burdens. While librarians may be eager to emphasize digital resources and move away from physical ones, clearly some disciplines will be more willing to work toward these objectives than will others. Moving aggressively to a digital platform in the sciences may not provoke much resistance, but in the humanities may bring substantial faculty complaints. Digital tools offer different levels of value to different types of scholars, and libraries should target their efforts at transformation in the fields where positive attitudes and receptiveness to change already exists.

We believe that the elimination of print current issues is a fast-arriving reality (perhaps faster than some libraries recognize). This transition creates a number of important system-wide issues to be addressed, which may go unnoticed by individual libraries concerned with local problems. A reliance on digital information sources means that these sources must be reliable and exist in the long term, indicating a great need for the careful attention to digital preservation. As a component of this preservation concern, it is essential that a sufficient number of print copies are maintained, to serve as backups against digital losses and for the unique characteristics of the original artifact.[7] Without attention to these issues from the system-wide level, there is a significant risk that these issues will go unrecognized or unaddressed until it is too late. It is important that libraries anticipate the challenges and risks inherent in the print transition and act strategically to address them on the system level, rather than acting purely locally and allowing key concerns to go unaddressed.

[7] Ithaka is currently engaged in a study in partnership with UC Berkeley to determine the levels of print maintenance necessary to meet future community needs.

Figure 13: Percent of faculty & librarians strongly agreeing with these statements, by discipline.

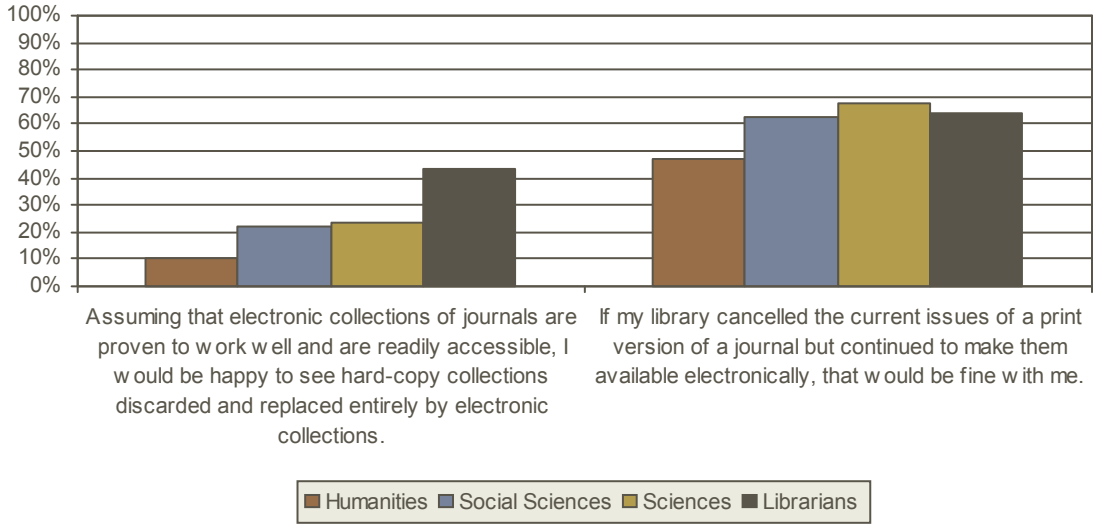
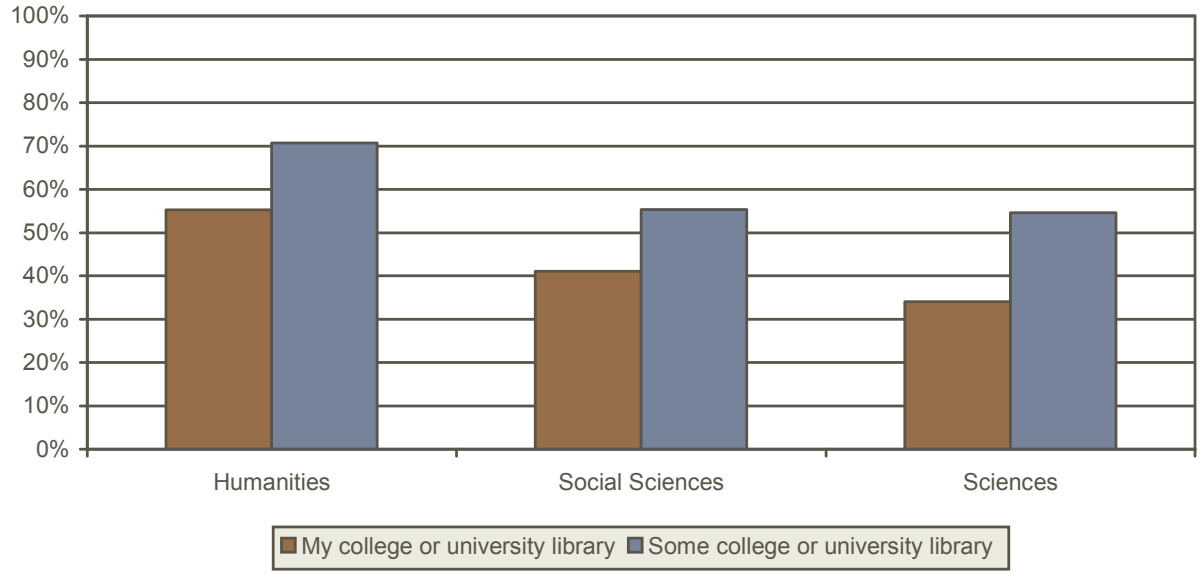


Figure 14: Percent of faculty agreeing strongly with the statement "Regardless of how reliable and safe electronic collections of journals are, it will always be crucial for _____ to maintain hard-copy collections of journals," by discipline.



FACULTY PUBLISHING PREFERENCES

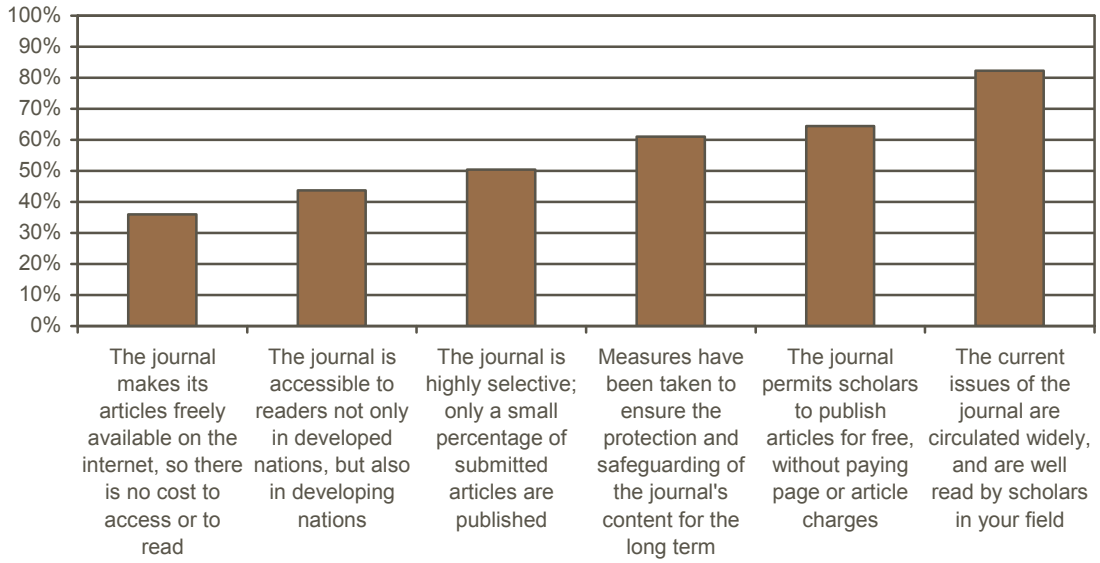
Although open access and increasing access to research in the developing world have been topics of substantial interest in our community, it is still the case that faculty decisions about where and how to publish the results of their research are principally based on the visibility within their field of a particular option. Faculty are most interested in publishing in journals with wide circulation and reading, and are far less interested in issues such as whether the journal is available for free to the general public or accessible to the developing world (see Figure 15). For the most part, these priorities are stable across disciplines and institutional sizes, except for a few minor variations – faculty at larger schools are somewhat more concerned with the selectiveness of the journals they publish in, and scientists are less concerned with the potential need to pay to publish in the journal, differences easily explained by the particulars of their environments.

Although in general, major disciplinary groups place a relatively equally low priority on free availability in choosing a publication venue, certain individual disciplines are more concerned. Education, geography, Latin American studies, music, and public health scholars are the disciplines most invested in free availability. A more obvious pattern can be seen in the case of concern about access to journals in developing nations. Although this is not generally a strongly held priority, area studies disciplines, such as African or Latin American studies, value accessibility in developing nations. While about 45% of the total faculty population is concerned with accessibility in the developing world, almost 70% of African and Latin American studies faculty rate this as very important in their publishing choices.

The foremost priority for faculty, in every discipline and every size institution, is in having their work seen by their peers within their field, presumably because this is the audience they seek to influence and the one that will most directly impact their career development. Audiences in the general public or the developing world may benefit from access to the work, but such considerations are second priorities at best for the majority of faculty.

With these priorities in mind, libraries and institutions should consider what services they can develop to assist faculty in maximizing their impact within their field. The Berkeley Electronic Press, for example, provides the SelectedWorks tool to assist researchers in presenting their work in an organized and accessible fashion. The RePEc (Research Papers in Economics) tool similarly allows researchers to create research portfolios easily, centralizing access to their work in an individual author profile. Both of these tools offer enhanced web presence as well as access to individualized tools to raise their profile. For example, SelectedWorks provides researchers with individual mailing lists, so they can alert their peers to new works. These sorts of tools and services offer researchers greater ability to market their work to their peers and enhance their stature within their community. Such services may also advance other agendas, but faculty members will most broadly be attracted to services which offer greater prominence within their field.

Figure 15: Percent of faculty identifying these statements as very important reasons why they select certain publication venues for their research.



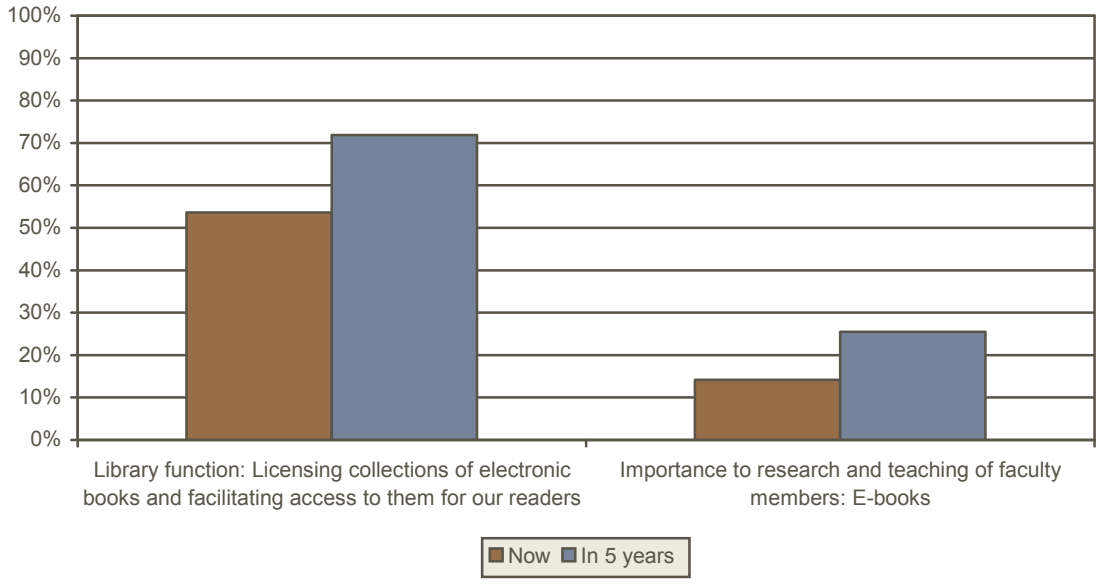
E-BOOKS

Although a long-hyped technology, e-books have had only a mixed impact to date. In our studies, we sought to understand what might be expected of them in the future. The reading technologies and collections available at present are limited and, at this time, there seems to be little sense among librarians and faculty that e-books will have the same transformative effect as electronic journals. Only a minority of faculty members use e-books frequently in their research and teaching (16% reporting often or occasional use, and just over 50% reporting at least rare use). This relatively low level of usage is basically constant across disciplines and institution sizes. Faculty, across disciplines and institutional sizes, expect the importance of e-books to grow only slightly in the future. Neither faculty members nor librarians expect e-books to constitute a viable substitute for print books; they are more generally seen as complementary.

Somewhat oddly given this low level of faculty interest in e-books, many librarians consider the provisioning of e-books an important role, and substantially more expect it to be one in five years (see Figure 16). This enthusiasm is notably higher at the largest institutions, with one-quarter of librarians anticipating a transformative role and two-thirds believing that licensing and making available e-books is an important library function, both numbers well above those of smaller schools. Librarians' enthusiasm in the face of a relative lack of interest from faculty may indicate that librarians are responding to student demand or expecting future faculty demand.

It is also possible that librarians believe wider use of e-books will improve their ability to provide library services in a cost-effective manner, and are interested in driving the transformation of the book medium. If librarians are interested in e-books due to the advantages they will offer to libraries, for example by simplifying circulation practices or freeing up shelf space, they should proceed carefully. Certain types of materials may be less controversial than others as e-books, and certain disciplines may have differing opinions on the acceptability of e-books. For example, researchers in education are relatively heavy users of e-books, and rate them more highly as important research tools than their colleagues in most other disciplines. This suggests that education scholars may be more willing to accept aggressive action on e-books than chemistry or geology researchers, who are very infrequent and unenthusiastic users of e-books. Librarians should be certain to understand what areas represent the easiest places to implement change in this area. By effecting change where it is least controversial, they can recognize immediate benefits without expending political capital, and lay the groundwork for later, more substantial changes. Of course, it may simply be the case that faculty disinterest indicates that e-book technology is not yet sufficiently mature, and should not yet be encouraged aggressively.

Figure 16: Percent of librarians and faculty rating these statements as very important (librarians with "Library function," faculty with "Importance to research and teaching"), now and in the 5 years.



DIGITAL REPOSITORIES

There has been much discussion in the past several years about the strategic opportunities that institution-oriented digital repositories might afford for the higher education community. Our study therefore sought to understand the landscape for these repositories and what faculty and librarians expect of them. Digital repositories are far more common at the larger institutions than they are elsewhere; about two thirds of large and very large schools already have repositories in place. At the same time, there is consistent interest in these repositories across the spectrum of libraries surveyed (see Figure 17).

The most common contents of repositories are digital images and special collections, followed by regionally important content (see Figure 18). This mirrors library goals for repositories, of which the most widely held are around themes of building and preserving an organized collection of an institution's intellectual assets. Libraries are most interested in using repositories to make local content more broadly available digitally, rather than to maintain local copies of widely-held content.

Although a popular topic of discussion is the possibility of repositories to transform scholarly communication, this objective is not widely held by librarians. There is more interest in this goal at larger institutions than at smaller schools, but even there it is the least widely held goal for repositories. It therefore comes as little surprise that only larger institutions' repositories contain substantial holdings of journal article content, and even there, journal contents are only held at relatively low levels (42% of large and very large institutions report holding preprints in their repositories, 35% postprints, 21% back issues, and 17% current issues of scholarly journals – whereas no more than 7% of small colleges report holdings in any of these four categories). Faculty interest in objectives for repositories basically matches those of librarians, being interested principally in using them to organize and preserve local material (see Figure 19). Of note is that faculty consider the promotion of locally created work to an external audience to be as important as any other goal for repositories, which matches the faculty focus described in the publishing preference section of this paper on maximizing their prominence in their field.

Still, the vast majority – almost two-thirds – of faculty members are not even sure if their institution has a digital repository and less than a third of those aware of a campus digital repository report having ever contributed content to it. It is clear that these repositories have not become embedded in faculty workflows; in fact, many faculty are not even aware of their existence. Faculty of all different disciplines and across different size institutions were relatively equally unaware if their institution has a repository. Based on these findings, in the absence of mandates or strong campus-wide leadership commitments, we do not foresee institutional repositories yielding a transformative influence on the business side of journal publishing. Other types of digital repositories, especially those for storing images and special collections, are much more likely to continue to grow in importance at all types of institutions.

Figure 17: Percent of libraries with digital repositories now in place, and percent of those which do not currently have repositories which have plans in place to create one.

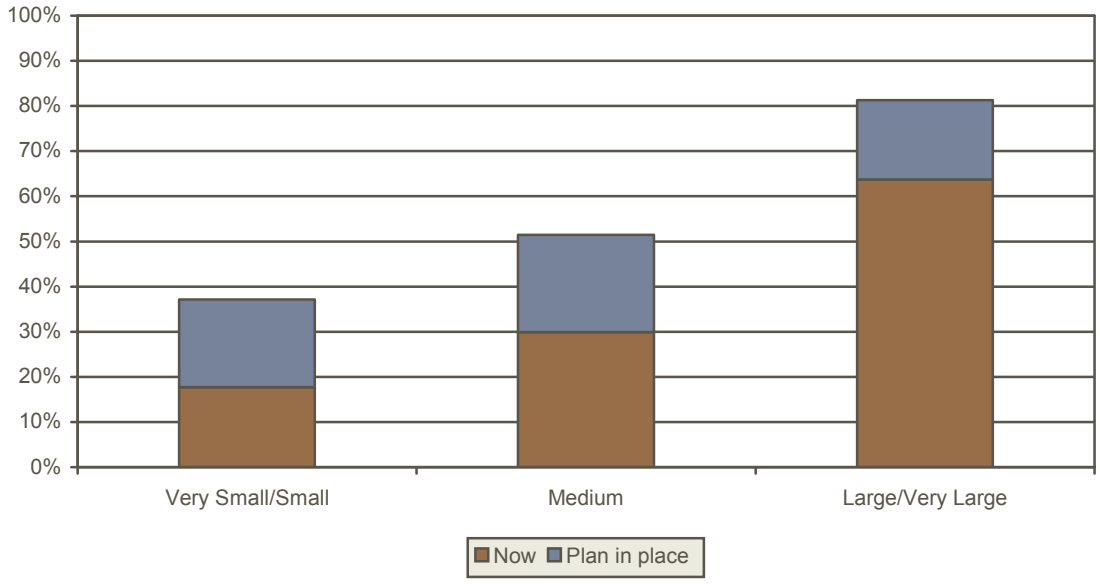


Figure 18: Percent of librarians indicating that their digital repositories contain these types of materials.

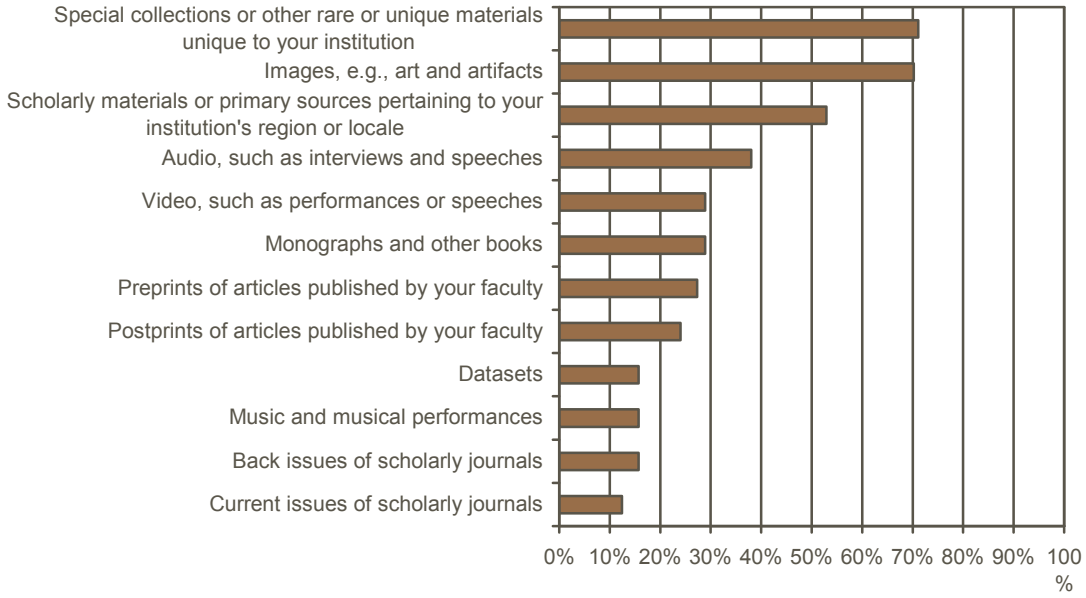
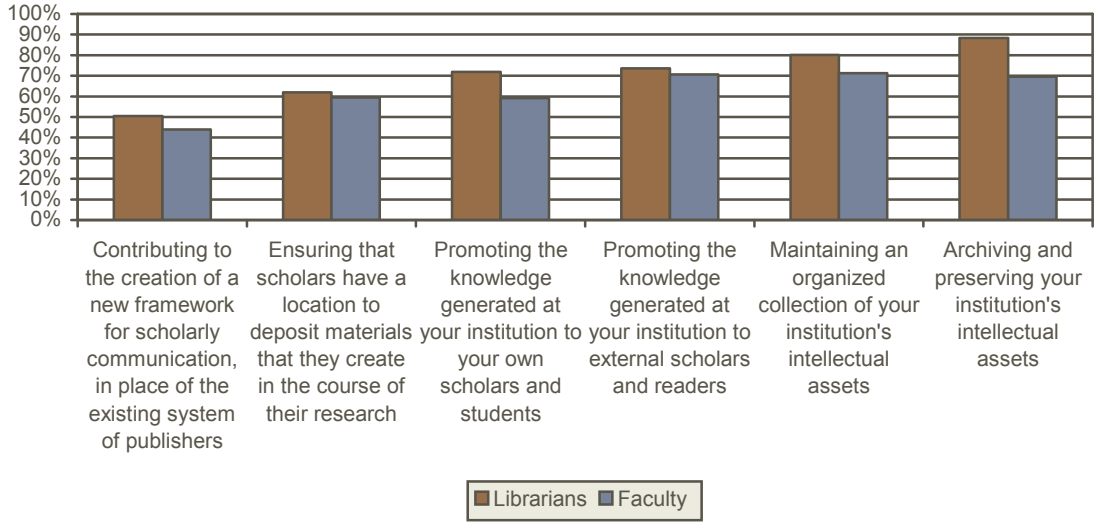


Figure 19: Motivations for digital repositories stated as "very important" for librarians and faculty.



PRESERVATION OF SCHOLARLY JOURNALS

Due to the interest of our affiliates JSTOR and Portico, we have been very concerned to understand whether faculty members appreciate the importance of preservation in the electronic environment. In fact, belief that preservation of electronic journals is very important grew from 2003 to 2006. This is a special priority at larger schools, as well as among scientists. Although scientists place the greatest importance on the long-term preservation of electronic journals, the importance assigned to this topic is growing rapidly across disciplines, and over three-quarters of faculty now feel this is a very important priority. At the same time, faculty express confusion and uncertainty about e-archiving and whether it is being implemented successfully, with humanities scholars expressing the most ambivalence. Asked about their satisfaction with how electronic journals are being preserved for the long term, less than a third of scholars report being very satisfied, and the majority are ambivalent or fail to answer the question, although satisfaction has grown slightly and failure to answer decreased since 2003 (see Figure 22).

Librarians tend to agree with the importance of this priority, especially at larger institutions, and they express a corresponding loss of interest in preservation of print materials (see Figure 20). The preservation of electronic journal content is already important to more librarians than is preservation of traditional library materials, and interest in digital preservation is growing as emphasis on traditional preservation shrinks. While many in the community assume that print preservation will be taken care of by the largest libraries, librarians at the largest institutions already view print preservation as less of a priority than their smaller college colleagues, and they expect it to decline in importance more steeply (see Figure 21). The great majority of librarians – almost 80% – do not feel that their library will have a permanent need to retain print copies of their journals in the presence of a high-quality digital collection. Notably, while librarians expect the importance of most of their roles will grow or remain steady in importance over the next five years, librarians expect the importance of preserving traditional, non-digital, library resources will fall substantially – while almost 70% of librarians consider this an important role now, less than 50% expect that it will be in five years.

Faculty members view the information in back issues of scholarly journals as extremely important. This view is most widely held by faculty at larger schools, perhaps as these have historically provided richer journal backfiles to their faculty. This belief is, however, consistently held across disciplines. Faculty members expect librarians to find a solution to the preservation needs that they view as critically important, and librarians seem to be responding to this expectation for electronic journals.

At the same time, librarians' attention is turning away from print preservation (appropriately, given the decreasing reliance on print format for scholarly journals). Decision-making about the future of print collections is necessarily grounded in local needs. In an earlier generation, this locally-focused decision-making led to disaster in the microfilming of newspaper collections, as libraries made the locally sensible decision to reclaim shelf space by performing mass deaccessioning of their print newspaper holdings with the rise of microform alternatives. Just as these decisions led to insufficient community-wide availability of printed newspapers, without a system-level perspective, local decision-making on print preservation may threaten the community-wide imperative that an appropriate number of print artifacts survive. Some sort of collective action may be needed here in order to avoid any losses. Some institutions, and their consortia or state systems, are beginning to consider their participation in shared print repositories, which supply a secure and formalized preservation framework that also allows local institutions to focus on meeting evolving reader needs. Ithaka is presently conducting a number of studies to help the academic community better understand how print repositories might be developed, including a study of the shared development of a repository by JSTOR and the University of California system.

Figure 20: Percent of librarians indicating that these functions of the library are very important, now and in five years.

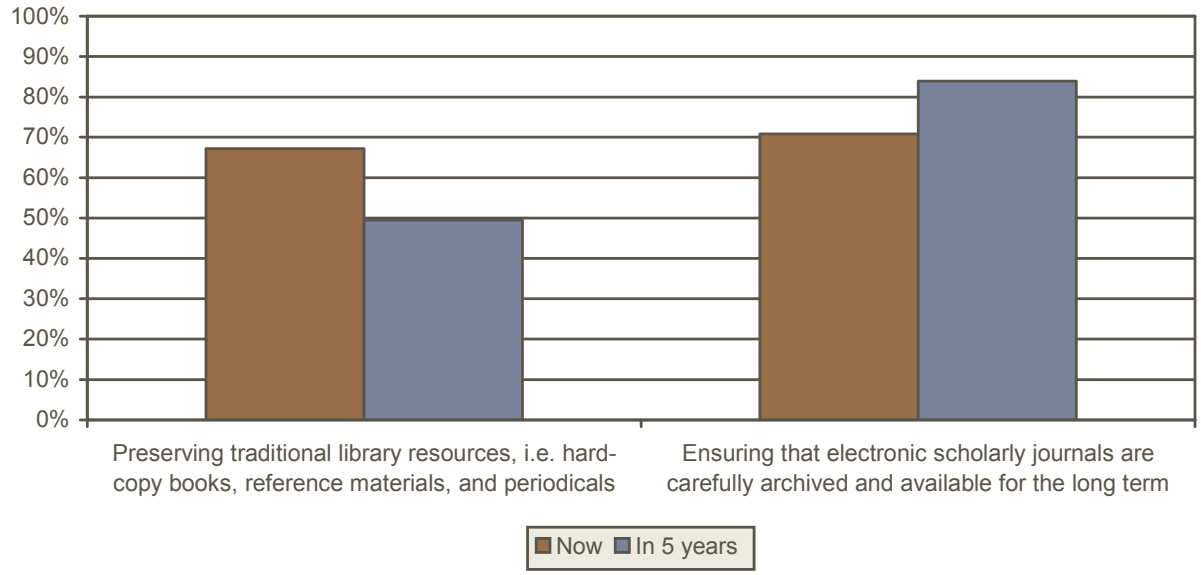


Figure 21: Percent of librarians ranking "Preserving traditional library resources, i.e. hard-copy books, reference materials, and periodicals" as a "very important" function of their library, now and in five years.

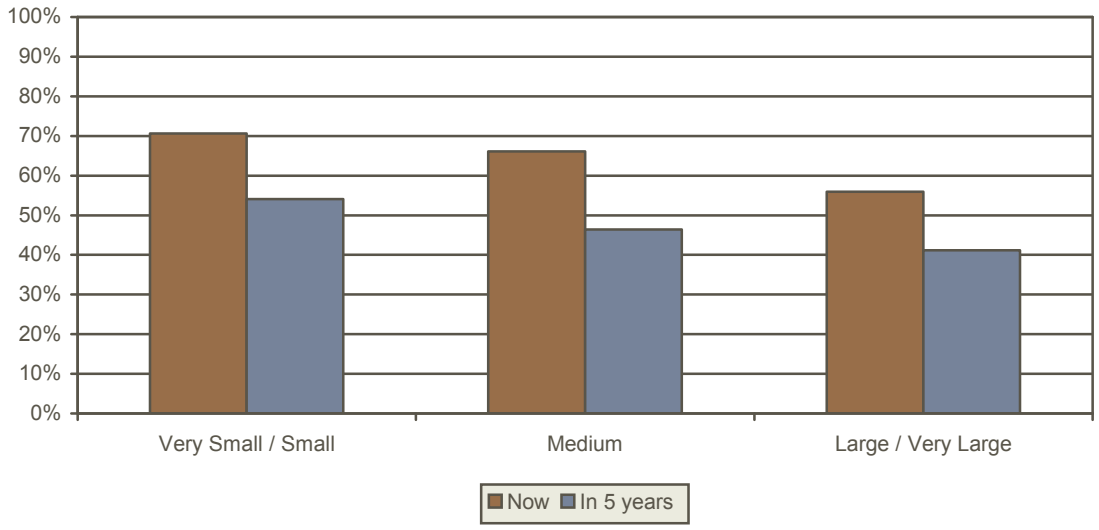
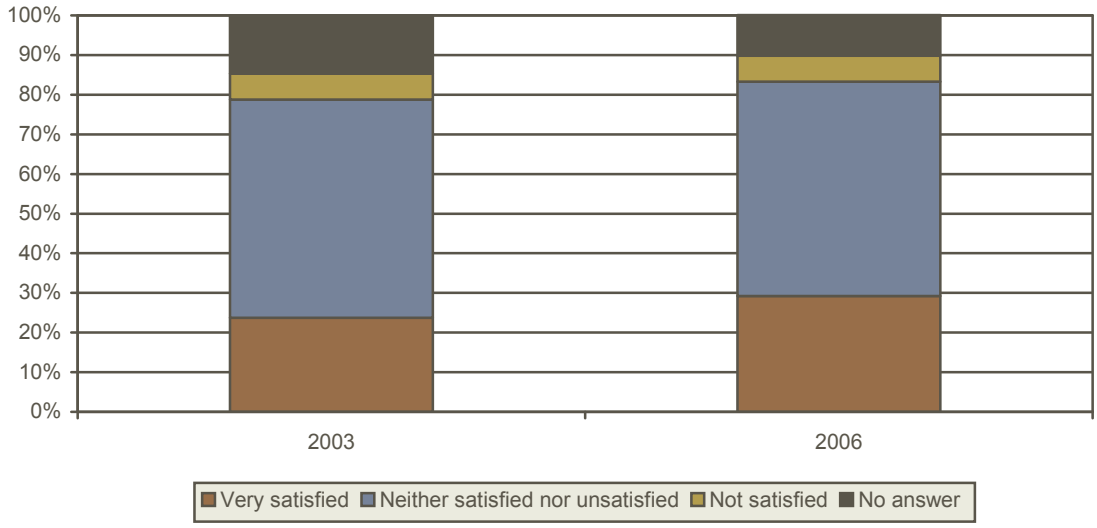


Figure 22: Faculty answers to "How satisfied would you say you are with the way electronic journals are being preserved for the long term?"



RECOMMENDATIONS

Analysis of these data indicates a wide range of directions that may help academic leaders, including libraries, pursue change on their campuses. Perhaps most significantly is the simple lesson that understanding user needs is of great value in planning for change. Libraries, for example, would be well served to engage in local intelligence-gathering to better understand how their faculty, students, and administrators use and perceive the library and its services. Information gleaned in this process may suggest otherwise unconsidered changes which could greatly improve user satisfaction, identify initiatives which are liable to be particularly controversial, and more. Regular analysis of the needs of one's constituency is an essential tool in effectively serving a diverse population. Additionally, this survey data suggests a number of specific lessons for libraries.

The (In)visibility of the library

An important lesson is that the library is in many ways falling off the radar screens of faculty. Although scholars report general respect for libraries and librarians, the library is increasingly disintermediated from their actual research process. Many researchers circumvent the library in doing their research, preferring to access resources directly. Researchers no longer use the library as a gateway to information, and no longer feel a significant dependence on the library in their research process. Although the library does play essential roles in this process, activities like paying for the resources used are largely invisible to faculty. In short, although librarians may still be providing significant value to their constituency, the value of their brand is decreasing.

This is an area of concern for all those concerned with the information strategy of the modern campus, but is of particular importance to the library itself; if attention and support fades from the library, its ability to contribute to the intellectual work of the campus diminishes, and its continuing institutional well-being may be threatened. Libraries should be aware of this decreasing visibility and take steps to improve the value of their brand by offering more value-added services to raise their profile on campus. It is essential to their long-term viability that libraries maintain the active support of faculty on their campuses, a factor which will be most effectively obtained by playing a prominent, valued, and essential role in the research process. By understanding the needs and research habits of scholars in different disciplines, libraries can identify products and services which would be appreciated by and of use to these scholars. Such efforts to be involved in the research process offer benefits to scholars, by providing them with services to improve their efficiency and effectiveness, as well as to libraries, recapturing the attention of scholars and contributing to a general awareness of and respect for the library's contributions.

The Importance of Disciplines…

The data show that different disciplines have dramatically different needs, interests, and priorities. An understanding of these differences must guide campus information strategy; a "one size fits all" solution will not, in fact, fit all. Although these differences should be considered in a wide range of information tasks – from campus publishing strategies to instructional technology decisions – this data identifies a number of specific challenges for libraries. In their planning, libraries should recall that different disciplines have widely varying reliance on traditional materials, and that the digital tools necessary for effective work in a particular discipline may simply be lacking. While emphasizing digital tools may offer savings and efficiency to libraries, and be welcomed enthusiastically in certain disciplines, it may be unrealistic to expect humanities scholars to keep pace with their scientist colleagues in this process. Those disciplines which are more enthusiastic users of digital resources may pose different challenges than those which are not. Highly digital scholars may disintermediate the library from their research process entirely, leaving the library with the challenge of remaining relevant and offering value-added services to meet the faculty's new needs. These same disciplines, however, may offer the best opportunities for change, as they may be enthusiastic partners with the library in new endeavors or in efforts to reclaim space by

removing print collections. And while libraries may be less concerned with disciplines still reliant on traditional research processes, these offer libraries the task of understanding why digital tools are not meeting their needs, and of identifying ways to create and offer digital resources which will be of value to these scholars. As we saw in the case of economics, however, the relationship of disciplinary research habits to the library should not be assumed to be fixed. Changing availability of resources may cause substantial shifts in these more traditional disciplines' research patterns, and libraries should be certain to be at least aware of if not leading these shifts.

…And of Science in Particular

The information age has most significantly impacted the sciences, which are experimenting with a wide range of new models of scholarship and communication, and demanding an increasing level of campus support. Serving the information needs of cutting-edge scientists for tools and infrastructure requires a coherent strategic approach, aligning the expertise of academic administrators, technologists, librarians, and others on campus. As our findings make clear, however, despite this growing significance of information to scientists, the role of the library is diminishing in importance fastest amongst this group. Libraries are providing these high-growth fields value in the acquisition of resources – for example in licensing costly journal collections – but otherwise have been relatively absent from the workflow of these high-growth fields, with an associated decline in perceived value. Some efforts have been made by research libraries to engage more deeply in the broader workflow of scientific research, but at the system level these efforts have been marginal, while commercial providers are making a major push to interject themselves throughout the scientific research value stream. Deep consideration of how the library community can best serve scientists and preserve scholarly values in the face of a rapidly changing and increasingly commercial ecosystem is needed, both on the local and the system level.

Faculty Needs in Service Development

For a campus or its library to create a viable information strategy for a competitive environment, it must develop and maintain a thorough understanding of the needs of its important constituents. Although Ithaka's survey work aims to paint a picture of changing faculty attitudes and needs system-wide, an understanding of local needs and priorities is also essential. While formal surveys such as these may be excessive on the local level, engaging closely with faculty across the campus will enhance understanding of the particular needs and concerns of their own faculty among those considering the role of information on the campus.

In the case of the library, both the library leadership as well as individual librarians should be reaching out to faculty members, formally and informally, to understand the nature of their teaching and research projects and how their needs are being met or could be met better. Deeper engagement with faculty offers the opportunity for the library to work in collaboration with faculty to achieve particular outcomes, rather than simply on their behalf. Engaging in discussion with faculty will provide the conduit to understand better each other's needs and perspectives and make it possible for them to work together effectively. The example of economics comes to mind, where faculty seem prepared for changing policies related to storage of print materials, a perspective that could very well mesh with objectives of the library. Together developing a well conceived plan for making the transition would benefit all parties.

System-wide Approaches to System-wide Issues

In a networked world, scholarship increasingly occurs across disciplinary or institutional boundaries, challenging the ability of any individual node to alone support this work. In some cases, there may be a need for new centralized entities to manage some of the complex interactions which occur on the system level. Even when this is not an appropriate solution, historically isolated campuses and libraries must come to think of themselves as parts of a larger whole, and develop tools and strategies for effective

collaboration. Without standards and protocols to guide interaction, work may be duplicated unnecessarily, and some types of collaborative scholarship may be hindered or blocked entirely.

A system-wide approach is also needed is on the issues of print and digital preservation. Preservation issues cannot be adequately addressed in a purely local fashion. For example, it is quite reasonable that any individual library might deaccession certain little-used print holdings, but there is a system-wide need to ensure the preservation of an adequate number of print copies to enable future scholarship and potential digitization work. Without system-wide frameworks in place, libraries will be unable to make decisions that effectively balance risk and opportunity with regard to the deaccessioning of print materials. Without the knowledge that print materials are being preserved at some accessible place in the system, libraries may be uncomfortable deaccessioning materials, but there may be substantial savings to be realized on a system-wide level by the deaccessioning of widely held print materials. Similarly, libraries must collaborate on digital preservation efforts. These efforts, essential to the long-term reliability of the predominantly digital scholarship that is now so prevalent, will not be effectively accomplished without widespread support from libraries large and small.

CONCLUSION

This period of transition poses serious questions about the future roles of the library. Information – the historic province of the library – is the focus of more attention than ever before, and yet the profile and relevance of the library is in decline. There are a number of possible futures for the academic library, and strategic thought and change is needed to ensure that we move into a world in which the library continues to play an important role in the intellectual life of the campus. The library exists to serve the needs of its campus; a clear understanding of these needs will allow the library to maximize its value to its constituency, both improving its own stature locally as well as facilitating scholarship, teaching, and learning among its community.

More generally, in our modern information age, many of the historical patterns of scholarship and scholarly communication are shifting rapidly; this will require strategic change on the part of the institution as a whole in order to keep up. A holistic consideration of the diverse information needs of the campus community is needed to effectively and efficiently facilitate scholarship, teaching, and learning. A collaborative approach, harnessing the expertise of many different campus constituencies – librarians, technologists, administrators, and more – may enable exciting new opportunities and growth. A deep understanding of faculty needs is critical to developing programs and services that will be valued, along with a willingness to make serious changes in situations where these needs do not match with the traditional roles. This document contains many of our observations of faculty needs on the system level, and suggests some of the themes which should be considered in planning for the future. It is equally if not more important, however, to engage with local faculty to determine what changes are and are not appropriate for the local campus environment. As we move further into the digital age, questions of campus information strategy must receive serious consideration from a variety of different players; care must be given to ensure that we develop a future in which scholarship, teaching, and learning are effectively supported, and in which important scholarly values are not lost.