SCHOLARLY COMMUNICATION: ACADEMIC VALUES AND SUSTAINABLE MODELS

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ABSTRACT

This study reports on five interdisciplinary case studies that explore academic value systems as they influence publishing behavior and attitudes of University of California, Berkeley faculty. The case studies are based on direct interviews with relevant stakeholders—faculty, advancement reviewers, librarians, and editors—in five fields: chemical engineering, anthropology, law and economics, English-language literature, and biostatistics. The results of the study strongly confirm the vital role of peer review in faculty attitudes and actual publishing behavior. There is much more experimentation, however, with regard to means of in-progress communication, where single means of publication and communication are not fixed so deeply in values and tradition as they are for final, archival publication. We conclude that approaches that try to "move" faculty and deeply embedded value systems directly toward new forms of archival, "final" publication are destined largely to failure in the short-term. From our perspective, a more promising route is to (1) examine the needs of scholarly researchers for both final and in-progress communications, and (2) determine how those needs are likely to influence future scenarios in a range of disciplinary areas.

SUMMARY OF FINDINGS

INTRODUCTION AND BACKGROUND

Many opportunities and concerns are at play in the field of scholarly communication. These result from capabilities afforded by new technologies, pressures associated with the purchasing power of library budgets, marginal operations by university presses, and the pricing structures of the publishing industry. Many of those involved in supporting new publishing and communication ventures see "the lack of willingness of the faculty to change" as a key barrier to moving to more cost-effective publishing models in an environment of escalating costs and constrained resources. The motivation for the project reported here was to assess the criteria by which faculty decide when and in what venues to publish or otherwise communicate the results of scholarly research. In particular, we were interested in how faculty values relating to advancement and stature in their fields affect these decisions. This was the first step toward making a nuanced and insightful analysis of the roles that universities and faculty do and can play in the resolution of the perceived "crisis in scholarly communication." Although limited in scope, the results of the study reported here strongly confirm the importance of faculty values and the vital role of peer review in faculty attitudes and actual publishing practices.[1]

The primary goal of this research, then, was to provide a preliminary descriptive analysis and understanding of the academic value systems associated with scholarly publication and communication, including means of communication extending beyond archival publication:

- Within a discipline. (For example, what do scholars perceive as necessary to make a name for themselves?) It is recognized that there are different needs and value systems for different disciplinary areas, that different disciplines are in different stages of incorporating electronic communication, and that some disciplines, e.g., architecture, have products other than text.

- Within a university. (For example, what are the value systems of the academic promotion and advancement processes, as perceived by different actors in those processes?)

[1] The original proposal upon which this research is based can be found at http://cshe.berkeley.edu/research/scholarlycommunication/index.htm

Our research was considerably facilitated by the very structured review process for appointment, promotion, and advancement at the University of California (UC). That process involves formal review at regular intervals, both before and after tenure is awarded. These reviews are initiated in comprehensive written form by the department chair, using material drawn together and submitted by the faculty member. External letters of evaluation are solicited and included for appointments, promotions, and certain critical advancements within the rank of Professor. The package, or "case," is then reviewed by the dean, by a specially appointed *ad hoc* committee for promotions, and by the Committee on Academic Personnel (denoted the Committee on Budget and Interdepartmental Relations, or "Budget Committee" for the UC Berkeley campus), who then make a recommendation. That recommendation is followed by the campus administration in nearly all cases.[2] The criteria for advancement are put forward in the University of California Academic Personnel Manual.[3]

OVERVIEW OF METHODS

The primary object of our research was the development of five interdisciplinary case studies. These disciplinary case studies, based on direct interviews with relevant stakeholders, almost all of whom were associated with the UC Berkeley campus, describe the state of scholarly communication in each of five fields: chemical engineering, anthropology, law and economics, English-language literature, and biostatistics. In the case of law and economics, it was the intersection of these two broad fields that was examined, not the sum. These particular five fields were selected by criteria of obtaining a diverse array of disciplines and publishing traditions, and taking advantage of the fact that at least one member of our project steering committee had deep knowledge of each of the disciplines selected. (See appendix A for a complete list of our steering committee members.) We also developed two smaller case studies representing the views of librarians and former Budget Committee members across these five disciplines. These "thickly described" case studies have the potential to enable a more precise identification of the factors associated with academic and disciplinary value systems. More specifically, such case studies should facilitate the identification of the factors that influence attractiveness, viability, and financial sustainability of different methods of scholarly communication for various participants in the publication/communication system, including: authors (producers), researchers (consumers), libraries, and publishers.

Formal interviews were conducted during the 2005-06 academic year with forty-nine individuals, thirty-one of whom were faculty (comprising regular faculty, former/current faculty administrators, and recent ex-Budget Committee members). Twenty-two of the faculty interviewed were also editors of scholarly journals or had been so in the recent past. Five librarians were interviewed, as were two campus-level academic administrators. The remaining eleven interviewees were drawn from our steering committee. The basic interview protocol, initially designed for faculty, was modified as required over the course of the project to include questions of particular relevance to each class of stakeholders. As a one-year project, our sample was biased (UC Berkeley only) and relatively small (fewer than ten informants per discipline), so extensions to other institutions and disciplines should be made with caution. As an external check to the UC Berkeley perspective, we include in each case background research on innovations taking place internationally in the targeted fields. A more detailed and comprehensive overview of our methods can be found in appendix B.

The academic values that we have identified in this project may be specific to the most prestigious of universities, where faculty researchers nearly always have their papers accepted for publication and can

[2] A description of the academic advancement process for faculty and the role of the Budget Committee may be found at http://academic-senate.berkeley.edu/pdf/Intro_to_BC.pdf.[2]

[3] Academic Personnel Manual, University of California, Section 210. http://www.ucop.edu/acadadv/acadpers/apm/apm-210.pdf

publish wherever they want. It is also true that the values exercised at these leading universities will likely be emulated throughout the academic community.

FINDINGS

The descriptive case studies for each of the five disciplines can be found in appendix C. The non-disciplinary case studies for the Budget Committee and Librarians can be found in appendix D.

Peer Review

Conventional peer review is so central to scholars' perception of quality that its retention is essentially a *sine qua non* for any method of archival publication, new or old, to be effective and valued. Peer review is *the* hallmark of quality that results from external and independent valuation. It also functions as an effective means of winnowing the papers that a researcher needs to examine in the course of his/her research.

Peer review was cited as an essential factor when faculty were asked about: (1) their perceptions of both standard and newer forms of publication, (2) disadvantages of newer forms of publication, (3) where one should publish to make a name for oneself in the field (e.g., publish in top flight peer reviewed journals), and, of course, (4) peer review specifically.

There is a large tendency for many members of the research community to equate electronic-only publication with lack of peer review, despite the fact that there are many examples to the contrary. Because of the very nature of peer review, this factor holds back even those who are fully aware of the advantages of fully peer-reviewed e-journals, because they know that the individuals reviewing their work for advancement may well not have that awareness.

It will be important to try to separate the issue of peer review for newer, electronic journals from those issues associated with the fact that most such journals are simply new and not yet well established. To some degree, however, peer review and the means of publication and dissemination can be separated. For example, there are authors whose work is peer reviewed and published in prestigious print journals, but who also retain rights to place the article on their own website. As noted by some interviewees, the result is that the work is accessed far more often on the website than in the published print journal.

Thus, peer review is essential, although there is some worry that the quality of peer review may be declining. The result is that it may be easier to rely on the tried-and-true outlets. It was noted that the locus of peer review has, in some cases, moved out of the institution. Specifically, there is a growing tendency to rely on secondary measures associated with peer review, such as: perceived journal quality, selectivity, and/or stature; the fact that papers are invited; or keynote lectures for conferences. There is reliance, for instance, on university presses and reviewers of journals to evaluate scholarly work. (Even though reviewers for university presses are academic faculty, the editor exerts much more independent judgment than is typical for peer-reviewed journals published by scholarly societies.) In some cases, the Impact Factor,[4] may also serve as a gauge of quality.

[4] The so-called Impact Factor is a measure of the citation frequency of papers in journals and is thereby equated by some to the stature and presumably the prestige of the journal. See, e.g., R. Monastersky, "The Number That's Devouring Science," *Chronicle of Higher Education*, October 14, 2005. Available at: http://chronicle.com/weekly/v52/i08/08a01201.htm. *ibid*., "Impact Factors Run into Competition," Available at: http://chronicle.com/weekly/v52/i08/08a01701.htm.

Despite the goals and quality of peer review, interviewees mentioned several times that the proliferation of journals has resulted in the possibility of getting almost anything published somewhere, if the author persists in trying to gain acceptance by different journals.

One issue for faculty editors is the difficulty in finding reviewers who are qualified, neutral, and objective scholars in a fairly closed academic community. This is compounded by the fact that the increasing quantity of publications requires more scholarly input for the review process, while already overburdened academics have limited time to participate. Editors, in particular, have a difficult time coordinating reviewers' schedules and available time.

The peer review process is more complicated for compound disciplines because many such fields are relatively nascent and therefore result in small specialized communities of scholarship. Faculty in these interdisciplinary fields often prefer to publish within a single discipline because the most highly respected and recognizable outlets reside there; however, divergent expectations (ranging from quantity to methodology to writing style) and standards (especially with regard to quality) among fields often make it difficult for reviewers in standard fields to judge submissions from compound disciplines. Interdisciplinary publications may address this concern more readily as they become more prestigious. In fields that are joined with law, such as law and economics, the utilization and perception of peer review is particularly complicated, given the prominence of student-edited law reviews.

Online Publishing

Although online publication may be less of a concern to senior faculty with regard to advancement, they are often hindered in using it by their lack of ability or time. There is also no perceived reward for changing the *status quo*. Personal desire and interest, however, are often the drivers for participation in newer modes of communication and publication for senior faculty.

Publishing in online-only resources is perceived among junior faculty as a possible threat to achieving tenure because online publication may not be counted as much, or even at all, in review. Despite the fact that written policy indicates that online publications should not be undervalued in consideration of advancement, actual practice may vary.

Some interviewees observed that new modes of communication and publication contribute to a proliferation of scholarly material. The result is that it is more difficult for time-pressed faculty to sift through all that is available in their fields. There is the perception that it is easier to get published in newer electronic journals and that they contain material of lesser and dubious quality. There is also a perception that the number of pages publishable in a journal is not restricted by cost for e-journals in the same way that it is for print journals, and thus editors of e-journals are not pressed to be as selective.

Crisis/Cost Issues/Open Access

Many faculty interviewees believed that UC Berkeley is insulated to a large degree from any crisis in scholarly publishing. The prestige of the institution and the quality of faculty work often enable faculty to publish with the most prestigious journals or presses. For the most part, faculty do not concern themselves with the burden of cost to the institution resulting from the scholarly publication process.

These scholars had minimal, if any, understanding of open access models, although they were somewhat familiar with the "open" concept. We found that scholars are generally receptive to the ideal of making knowledge available for the "public good."

Positive Perceptions

Faculty did have a good understanding that the high cost of journals is problematic and faculty in chemical engineering, in particular, viewed open access models as a possible alternative to commercial presses. Some faculty refuse to publish in particular journals because of their high cost and pricing mechanisms. Senior faculty appeared to be more comfortable with the idea of sharing material at the early stages of work (e.g., preprint servers), as did faculty in chemical engineering, biostatistics, and law and economics in general. Archaeologists already use some open access websites to share field observations.

Negative Perceptions

The largest concern among scholars was the perception that open access models had little or no means of quality control, such as peer review. Some faculty in biostatistics, interestingly, equated the high cost of print journals with quality and believed that online open access models are "cheaper" and therefore might be prone to lower standards.

Others expressed fear that scholarly work placed in open access models could be "stolen," although faculty with a better understanding of the online publication process saw licensing bodies, such as Creative Commons, as a potential solution.

There was also some concern about the ownership of open access and author-pays journals. Should universities act as repositories and implement some sort of selection process, there could be legal liabilities regarding the acceptance and rejection of work submitted by the institution's own faculty, who the institution then judges for advancement. Faculty also expressed concern regarding how such repositories would be managed, including how subjects would be organized.

Author-pays Publishing Models.

Scholars were generally not aware of author-pays models. Once explained, faculty responses were universally negative. Paying to publish one's work was perceived as self-promotion and fundamentally in conflict with the peer review process. English-language literature faculty, in particular, equated the author-pays models to vanity presses, while those in the sciences equated it with advertising and therefore believed that any such publication would compromise academic integrity. Many faculty realized that publication costs are an issue and believed that the author-pays model could possibly serve to discriminate against countries, institutions, and faculty with fewer financial resources. In particular, scholars from all fields expressed concern that such a model might exacerbate differences between the sciences and the humanities since funds to cover any charges would likely come from grants. Faculty who were in fields that lacked a sense of urgency in scholarship, especially English-language literature (and one interviewee in biostatistics), viewed the author-pays model as particularly irrelevant. It should be noted that page charges have been a reality for some disciplines, and could have a particularly chilling effects on those who rely on expensive graphics in publications. For scientific literature, however, page charges have now largely disappeared.

Enhanced Capabilities of Electronic Communication

Many faculty interviewed were happy to consume scholarly material afforded by new modes of communication and publication. Day-to-day scholarly practice uses them enormously, but for the last stage of scholarly practice, archival dissemination of scholarly work, scholars rely on traditional publishing formats with few exceptions.

There are some clear advantages to newer forms of publication that are recognized by a wider circle of scholars than those who have actually used them. These include the ability to reach a larger audience, ease of access by readers, more rapid publication even when peer reviewed, the ability to search within and across texts, and the opportunity to make use of hyperlinks. Administrators and faculty both cited the fact that new technologies enable innovation in scholarly work. Anthropologists and chemical engineers agreed that moving images and three-dimensional (3D) models are particularly positive attributes. English-language literature faculty noted that technologies enable new ways of conducting scholarly work, most notably manuscript comparison in which single interpretations are no longer necessary because access to multiple interpretations is possible. Faculty, especially chemical engineers, believed that newer technologies have a democratizing effect on scholars outside of North America. The ability to have enough information (e.g., software code, back-end data, etc.) to enable the reproduction of statistical analyses was of particular importance to faculty in biostatistics.

Data Storage/Management Needs

Data storage and data management needs vary depending on the discipline and even subspecialty. Data produced by scholarly work vary both across and within disciplines, and vary from interpretive text, to visual or motion images, to three-dimensional (3D) renderings or computer simulations, to observations whether in numeric or text form. Scholars in some fields also rely upon existing datasets rather than new data. In the sciences, grants monies often fund data management and storage. It was noted that funders rarely dictate how data should be preserved.

There is little to no institutional support for data management and preservation according to our interviewees. As a result, individual scholars are responsible for maintaining data integrity. Overall, faculty were concerned about the rapid evolution of technologies, which often results in archaic storage devices and thereby loss of work. In some fields with data-rich scholarship, such as biostatistics, there was the concern that not all data can be stored. Some suggested that their department or the university should have policies in place to address this problem.

The Budget Committee

Interviewees who had served on the Budget Committee with terms ending more than two years ago had not encountered the need to review non-conventional forms of publication and communication, and thus this was not a significant issue during their service. Because of academic specialization, the nine Budget Committee members, in most instances, do not have the disciplinary knowledge necessary to judge themselves the research in cases that they review. Thus there is a heavy reliance on peer review to aid the Budget Committee in its evaluation of scholarly work. As well, correctly or not, lack of peer review is associated with newer forms of publication.

Former Budget Committee members believed that the advancement process should be supportive of non-traditional publishing models, provided that peer review is strongly embedded in the process, and that it should be unprejudiced toward those scholars exploring new modes of publication.

Despite faculty perceptions to the contrary, those with Budget Committee experience indicate that there is some degree of flexibility built into the review process. Former Budget Committee members and higher administrators who receive Budget Committee recommendations commented that the committee reflects standards in disciplinary fields and does not mandate appropriate methods, which effectively serves to maintain *status quo*. Some explained that if the faculty member or department chair could make the case that a particular publication outlet was sufficiently peer reviewed for quality and well-known within a particular subfield, then the Budget Committee would give it appropriate weight. Regardless, faculty are

often unwilling to take risks by using newer publishing technologies that they presume may not be recognized by the Budget Committee as reputable and/or prestigious venues.

Librarians

Librarians appeared to have a much better understanding of available resources and the politics among publishers. They often were more technologically savvy than their faculty counterparts and were well aware of new technologies likely to affect available resources.

Unlike many faculty, librarians who were interviewed strongly perceive a crisis in scholarly communication and see the rise in new forms of communication and publication as a positive step—albeit slow and evolutionary. Librarians indicate that they try to educate faculty about the scholarly communication crisis and how faculty might play a larger role. Although new modes of communication are not widely used by faculty for presenting their work, librarians believe that open access and/or author-pays models are viable alternatives to the problem of unsustainable journal costs. Online resources were also viewed largely as advantageous from a consumer perspective for many of the same reasons that faculty provided, e.g., ease of access, speedy dissemination, and so on. Librarians also believed that online technologies enable them to connect faculty and students with better information.

Librarians' main concerns about new modes of publication were along fiscal and technological dimensions, namely the economic sustainability of newer models and the role of the library in that financial equation. Librarians also pointed out the "version" problem for placing scholarly material in repositories. Most problematic for librarians, however, is the increasing reliance by both students, and to some degree, faculty, on search engines such as Google and Yahoo.

Publishers and Editors

Publishers with whom we made formal contact included the University of California Press, the Berkeley Electronic Press (bepress), the E-Scholarship project of the California Digital Library (CDL), the Public Library of Science (PLoS), Ithaka, the Electronic Publishing Initiative at Columbia (EPIC), and the Stanford Encyclopedia of Philosophy. Formal interviews of principals were conducted for the first four of these. We recognize that this is not a representative group of publishers. Twenty-two of the faculty members whom we interviewed were also editors of journals or had been in the recent past.

Perceptions among publishers and editors were tied closely to the mode (print/electronic) of publication, their institutional affiliation and philosophy, and often the disciplinary fields in which they specialized; thus their opinions often reflected those different viewpoints. Some felt that print publications were ineffective compared to electronic venues in disseminating work in a timely matter, although all recognized the challenges associated with newer forms of publication, regardless of format. Many of the publishers and editors we interviewed were aware of the concern about increasing costs.

Publishers concurred that academia is in a transition period with regard to publishing, and they understood the complex interplay of tenure requirements and distribution choices among faculty. Although scholarship is inherently innovative in both approach and method, and in that way a natural match for newer forms of publication, change is often hindered by institutional requirements and standard practice, such as the perceived necessity of traditional publication for advancement and achieving tenure, and apprehension among scholars that reviewers will not accept newer forms of publication for advancement. Most agreed that use of newer forms of publication has not yet reached a sufficient saturation point to tip the scale and opined that the power to change rests with the university world—for both production and consumption. They recommended incentives for faculty, both in terms of policies (e.g., advancement process) and resources, as well as budgetary and technical support for libraries.

Publishers shared with other interviewees the concern about perceptions that equate low cost with low quality for electronic forms of publication. Although all agreed that quality control systems are not in place in most open access repositories, publishers in general pointed out that electronic journals can and often do use the same review process as traditional print journals. Several also expressed concern about the peer review process, and believed that too much emphasis is placed on outside opinion and prestige rather than a review of actual content quality.

REFLECTIONS

Methods: Lessons Learned/Challenges

While our investigations have yielded rich and descriptive case studies that shed light on the current state of scholarly communication, there are limitations to our study. Our small sample, both in the number of participants and in the range of discipline, makes generalizations at this stage sketchy at best. Furthermore, we focused specifically on one campus in the University of California (UC) public system, UC Berkeley, and our results at this stage are thereby obviously biased. To develop any more general conclusions applicable to wider populations, future investigations will need to include other campuses and/or institutions.

This project was particularly labor-intensive given the scope and quantity of data collected in a short timeframe. We relied upon a structured one-on-one interview methodology to gain insights into faculty and administrators' perceptions and practices. While this methodology was essential for our purposes, it is a process that can be complicated by delays and occasional resistance. We discovered that some already busy faculty had difficulty finding time to participate in our approximately one-hour interviews. In some cases, this proved to be an obstacle to recruitment, and we relied significantly on personal connections to enlist faculty interviewees. Participant resistance could have larger implications for data collection, such as limited or biased sampling.

Interviewing also depends upon a consistent method of data collection (e.g., structured protocols, trained interviewers, etc.), reliable technology, transcription personnel, and content experts (usually the interviewers) who can "clean" transcribed interviews. It is clear that sufficient time, flexibility, and resources would be necessary for collecting and analyzing useful data on a larger scale.

Early in our study, we developed a comparative structure for our case studies. Our analytical methods were efficient given the scope and short timeline of this study; however, for a larger project, we recognize the potential advantage (and higher cost) of coding systematically and analyzing descriptive data with more structured, computerized coding schemata.

Conversations with former members of the UC Berkeley Budget Committee were fruitful, even candid, but such dealings required careful maneuvering on the part of both interviewer and interviewee that may be difficult to extend to a more comprehensive research project, especially if work were expanded beyond the UC Berkeley campus. As we devised our methodology for obtaining information about Budget Committee review of faculty advancement cases, it became apparent to us that direct interviews of Budget Committee members would be far more effective and efficient than actual review of the written record of individual advancement cases, which would be a sensitive matter anyhow. Reasons are that a Budget Committee member would have hundreds of cases in mind while answering an interview question, whereas it would require a greater amount of time to review the actual contents of hundreds of cases. As well, it is possible, and perhaps likely, that even if pertinent views of newer means of publication were relevant to the recommendation in a case, the Budget Committee would not have put that fact in its formal, written comments. Our Budget Committee interviewees were drawn from recent members of the

committee who had responsibility within the Budget Committee for primary review of cases in the disciplines that we considered. Recent (but former) members were interviewed, since it is a policy of the Budget Committee that current members do not give interviews.

Utility of the Highly Structured University of California Advancement System

The highly structured advancement system of the University of California, described in a footnote to the white paper in appendix E, has been advantageous to us in many ways in conducting our research. First, we know who the actors are at the several stages of the review process and we were able to talk with them directly. Second, we were able to compare and contrast the views of those in the different steps of the review process—faculty, department chairs, deans, (former) Budget Committee members, and campus-level academic administrators. As well, we can ascertain the views of bodies such as the Budget Committee by those involved in other stages of the review process. Third, at each of the levels of review we had access to persons who have reviewed many advancement cases and who therefore can make informed comparative judgments. This fact gives reviewers the ability to identify the relative importance of different factors, including the medium and nature of the publication vehicle. Fourth, the nature of this review process affords the wherewithal of assessing the degree of importance and roles of peer review and the vehicles for peer review that hold cachet. By talking with reviewers involved with the Budget Committee at different times in recent years, we have been able to make initial inferences of whether and how the values ascribed to new media by that body are changing.

CONCLUSIONS

The descriptive case-study approach began to elucidate the ways in which faculty do or do not perceive electronic means and other new capabilities as enhancing the: (1) quality, effectiveness, and immediacy of communication of a scholar's research output to peers and users, (2) recognition of that research, and (3) efficiency and effectiveness of progress of scholarship as a whole.

The disciplinary case studies also enabled a more precise identification of the factors associated with academic and disciplinary value systems that influence viability and financial sustainability of different methods of scholarly communication for various participants in the publication/communication system, including: authors (producers), researchers (consumers), libraries, and publishers.

From an examination of the ways in which value systems in five disciplinary areas affect scholarly publication and communication practices, we reached the following conclusions:

- Peer review is the coin of the realm. It is the value system supporting assessment and the perceived quality of research. It is commonly viewed as the primary mechanism through which research quality is nurtured, and through which research is made both effective and efficient. There was also a strong perception that peer review provided an excellent quality filter for the proliferating mass of scholarly information available on the web.

- Within compound disciplines, however, peer review can be complicated by differing standards and expectations among fields.

- There is some concern that the locus of peer review has moved out of the institution. This has particular repercussions for academic advancement as increasing reliance is placed on the prestige of publication rather than a review of actual content and quality. This is especially a concern for those scholars in compound disciplines, where quality assurance depends upon a small group of specialized academics.

- There is presently a somewhat dichotomous situation in which electronic forms of print publications are used heavily, even nearly exclusively, by performers of research in many fields, but perceptions and realities of the reward system keep a strong adherence to conventional, high-stature print publications as the means of record for reporting research and having it evaluated institutionally. This was true of all of the disciplines we examined. In the science fields, although major journals are maintained in print form, electronic replicates are used increasingly for most access and research.

- While both are critically important to one's career, the means of publication and communication for gaining advancement within the institution differ significantly from those for making one's name within a discipline. The former depends almost exclusively upon final, fully peer-reviewed archival publication, whereas the latter is more fluid and oriented toward partial results, meetings and information exchanges with other researchers during the course of the research ("in-progress communication"), as well as final, archival publication.

- Such "in-progress" communication also fulfills needs such as (1) gaining the critical thoughts of others while one's research is in progress, (2) "staking claim" to one's activity and accomplishments in an area, and (3) sparking thoughts and new ideas as a product of the discussion.[5]

- In-progress communication does not substitute for the need for final, archival presentation and dissemination of research results. They serve different purposes and needs. Both are important.

- There is much more experimentation with regard to means of in-progress communication, where single means of publication and communication are not fixed so deeply in values and tradition as they are for final, archival publication.

- From an institutional standpoint, there are looming questions about how to support faculty in their scholarly practice. Our interviews suggested that at UC Berkeley, at least, there are currently few if any mechanisms or structures that support storing, archiving, and sharing the significant research products of faculty, such as databases, collections of literature, etc., that are created *en route* to ultimate archival publication. Based on our preliminary research, this is true of other institutions as well, except in a few fields.

- Campus-level academic administrators perceive an inevitable but slow evolution toward new forms of publication (particularly in fast-moving scientific disciplines), similar to the shift from print journals to conference proceedings that occurred in computer science in the 1970s. They see this evolution gaining momentum and credibility. Respected scholars, however, will begin using such venues in great numbers only once these venues, and the peer review associated with them, become better established.

- According to our interviewees, the Budget Committee has so far rarely needed to address the issue of publication venue. This is because so few new forms of publication are represented in the cases that come through the committee. Former Budget Committee members, however, believed

[5] A classic example of in-progress communication from the pre-electronic era is the Gordon Research Conferences, where current research is presented and discussed at length, but there are no written materials, nor are the presentations final or archival. The stimulating environment of these and similar conferences is particularly valuable for generating one's own research ideas. Another traditional example is faulty invitations to other institutions for visits built around a seminar.

that the committee would be open to new forms provided that they meet the same standards for peer review and quality as traditional forms.

- Campus-level academic administrators perceived a distinction between peer review in the discipline and peer review for promotion. While clearly interconnected, administrators maintained that discipline-based peer review cannot stand on its own; the input of immediate colleagues in addition to discipline-based peer review is necessary for promotional consideration. On the other hand, administrators believed that it was possible, in some cases, for local peer review to substitute for discipline-based peer review, for instance, in considering the quality of work published in a non-peer-reviewed journal.

Results from the project suggest that examinations of how new media should and will affect scholarly communication and publication must recognize that, for the foreseeable future, the values surrounding final archival publication are deep and relatively inflexible in research universities. On the other hand, what scholars value and want will eventually become accepted practice. This is a much more realistic way of looking at issues than is devising models and modes of communication because of their cost efficiencies or other non-research criteria and then trying to draw scholars to them. Approaches that attempt to "move" faculty and deeply embedded value systems directly toward new forms of archival, "final" publication are destined largely to failure in the short-term. From our perspective, a more promising route is to (1) examine the needs of scholarly researchers for both final and in-progress communications, and (2) determine how those needs are likely to influence future scenarios in a range of disciplinary areas.

In summary, we suggest that more innovation does and will occur first in in-progress communication than in final archival publication. One can foresee a scenario where useful and effective innovations in in-progress communication will eventually serve as drivers for improvements in final archival publication. It is therefore worthwhile to gain deeper insights into the needs, motives, and new capabilities within in-progress communication as well as for final, archival publication.

APPENDIX A

STEERING COMMITTEE

The project is guided by a steering committee composed UC Berkeley campus faculty and others with complementary background and expertise.

- **C. Judson King**, Principal Investigator; Director, Center for Studies in Higher Education. Provost and Senior Vice President - Academic Affairs (UC System) Emeritus. Professor of Chemical Engineering Emeritus. Former Provost - Professional Schools and Colleges, Dean of the College of Chemistry and Chair, Department of Chemical Engineering, UC Berkeley
- **Ted Bergstrom**, Aaron and Cherie Raznick Professor of Economics, UC Santa Barbara.
- **Aaron S. Edlin**, Professor of Economics and Law, Co-founder and Principal, Berkeley Electronic Press
- **Thomas Goldstein**, Professor of Journalism and Director, Program in Mass Communication. Former Dean of Schools of Journalism at both Columbia and UC Berkeley.
- **Daniel Greenstein**, University Librarian, Vice Provost and Executive Director, California Digital Library, University of California.
- **Diane Harley**, Senior Research Associate, Center for Studies in Higher Education.
- **Nicholas P. Jewell**, Professor of Biostatistics and Statistics. Former Deputy Provost, UC Berkeley. Editor, Berkeley Electronic Press.
- **Thomas C. Leonard**, University Librarian, UC Berkeley. Professor of Journalism.
- **John Lie**, Dean, International & Area Studies. Professor of Sociology.
- **Peter Lyman**, Professor of Information Management & Systems. Former University Librarian, UC Berkeley.
- **Clifford Lynch**, Executive Director, Coalition for Networked Information; Adjunct Professor, SIMS, UC Berkeley.
- **John W. (Jack) McCredie**, Associate Vice Chancellor for Information Technology and CIO, UC Berkeley.
- **Daniel L. Rubinfeld**, Robert L. Bridges Professor of Law and Professor Economics. Former Deputy Assistant Attorney General for Antitrust in the U.S. Department of Justice.
- **Hal R. Varian**, Professor of Information Management & Systems, Business, and Economics, UC Berkeley.
- **Lynne E. Withey**, Director, University of California Press.

APPENDIX B

METHODS

The primary goal of the project was to develop five disciplinary case studies describing the state of scholarly communication in each of five fields: chemical engineering, anthropology, law and economics, English-language literature, and biostatistics. In addition to drawing on interviews, the cases include descriptions of innovative scholarly practice in the targeted fields. We also developed two smaller case studies representing the views of librarians and former Budget Committee members across these five disciplines.

Protocol Development and Pilot Testing

Five related interview protocols were developed, one for each group of interviewees: faculty, former Budget Committee members, librarians, and two protocols for different types of faculty administrators. The basic interview protocol was developed by identifying the key questions relevant to faculty experience and knowledge via various means including interviews with members of the project's steering committee.

The faculty interview protocol was piloted with two steering committee members and two additional faculty members, and was then revised. This basic protocol was modified as needed over the course of the project to include questions of particular relevance to faculty administrators, former Budget Committee members, and librarians.

Identification of Informants and Human Subjects Clearance

Faculty and librarian interviewees were identified both via recommendations from our personal networks and via random selection from departmental websites.

Human subjects clearance was obtained through the institutional review board before the start of the project, in summer 2005. All interviews were treated as confidential. All data are stored on a secure, password-protected server and interviewees are referred to in internal reports via code numbers. Because of the high visibility of some interviewees' positions, identities have been further obscured by hiding interviewees' gender and, in some cases, exact job titles.

Interview Process

Interviews were conducted in a semi-structured format, and all but two interviews were audio-recorded. (Of the interviews not recorded, one was due to technical difficulties and one interviewee declined to be recorded.) One or two researchers were present for each interview, including the primary investigator in seven instances.

Interviews were then transcribed and cleaned, and each was summarized, to extract and organize the main points. These summaries were then combined by discipline, including faculty, administrator, Budget Committee, and librarian summaries, as well as steering committee and pilot summaries when relevant. From these combined summaries, disciplinary case studies were developed. Two smaller case studies were developed for former Budget Committee members and librarians using the same procedure.

Informants

Interviews were conducted with forty-nine individuals. Demographics for the interviewees, averaged by department, can be found in Table 1.

Table 1: Demographic Information for Interviewees, Averaged by Discipline

	Chemical engineering	Biostatistics	Law and economics	English-language literature	Anthropology
Mean years in current position	6.29	14.58*	7.75*	12.00	7.83*
Mean years at Berkeley	20.14	19.83*	10.42*	18.57	18.33*
Mean years in current profession	21.50	26.33*	19.00*	26.14	26.50

*Averages for these cells are for $n = 6$ cases; one interviewee in each either could not remember, declined to answer, or was inaudible on the transcripts. For all other cells, $n = 7$.

Faculty

There were thirty-one faculty interviewees, six for each discipline (except law and economics, which had five) and two higher-ranking faculty administrators. Of these, eleven were women and twenty were men. Each discipline was represented by three regular faculty (two for law and economics), two current or former faculty administrators, and one faculty member who had served on the Budget Committee. Two additional faculty gave pilot interviews, and one of these was included in the relevant discipline case study (the other was from a discipline not represented in the current study, and was not included in the analyses).

These interviews were used in creating the disciplinary case studies. The interviews with former Budget Committee members were used additionally to create a separate, smaller case study representing the views of Budget Committee members across disciplines.

*Steering Committee member*s

An additional eleven interviewees (ten men and one woman) were members of the project's steering committee (Listed in appendix A). Four of these were faculty members in one of the disciplines represented in the study, and two had some knowledge of library practices; therefore, their responses were included in the relevant case studies. The other five were not included in the analyses reported here.

Librarians

Finally, five librarians who had some knowledge or specialization in relevant disciplinary areas were interviewed. Their perspectives were included in the disciplinary case studies. A separate librarian case study was developed, that also included the perspectives of two steering committee members with relevant expertise.

APPENDIX C: DISCIPLINARY CASE STUDIES

Case Study Outline

1. Introduction

1.1 Background
1.2 Profile of interviewees

2. Publishing models; the needs of the discipline and how the publishing model fits these

2.1 Perceptions of traditional and non-traditional forms of communication and publication
- Traditional forms of communication and publication
- Non-traditional forms of communication and publication

2.2 Perceptions of publishers, publishing models, and accessing new publications
- Publishers
- Publishing models: open access and author-pays
- Accessing new publications

2.3 Perceptions of data storage and preservation
- Types of data produced
- Data storage and preservation arrangements
- Data storage and preservation guidelines

3. Driving forces behind why faculty publish where they do

3.1 Perceptions of advantages and disadvantages associated with newer forms of communication and publication
- Advantages associated with newer forms of communication and publication
- Disadvantages associated with newer forms of communication and publication

3.2 Perceptions of factors influencing choice of publication venue
- Making a name for oneself both nationally and internationally
- The requirements for advancement with regard to publication
- The advancement process and new publication methods: a support or hindrance?
- The value of new forms of publication

4. The evaluation of traditional and new forms of communication and publication

4.1 Recent or current changes to the faculty reward systems
4.2 The evaluation of new forms of communication and publication
4.3 The process of peer review: deterioration versus improvement
4.4 The reward system and publishing practices: advice

5. An editor's perspective

6. The state of e-publishing

6.1 Current scholarly practices
6.2 Emerging scholarly practices
6.3 New publishing venues
6.4 Institutional support

CASE STUDY: ENGLISH-LANGUAGE LITERATURE

E1. Introduction

E1.1 Background

English-language literature encompasses the fields of British and American literature, as well as literatures written in English in other parts of the world. It can include other artistic genres and disciplines, such as film and performance studies, new media, linguistic and cultural studies, and women and gender studies. Scholars of English-language literature often work with other languages and national literatures, especially those in comparative fields such as classics, rhetoric, and medieval studies.

The standard forms of publication in English-language literature are scholarly monographs and peer-reviewed journal articles, with at least one of the former and several of the latter required for tenure. The field has been heavily impacted by the monograph crisis, and strongly reflects the tension between movement away from the print monograph, on the one hand, and the traditional academic value and reward system, on the other hand.

Increasingly, some books and especially journal articles are available online, while a few book presses and journals have become entirely digital. Some scholars and research groups use electronically enabled research practices now such as text encoding and author new forms of scholarship such hypermedia archives, electronic scholarly editions, and interactive digital projects.

E1.2 Profile of interviewees

We conducted interviews with six faculty members in English-language literature, including a number of administrators. We also interviewed the branch librarian in this discipline.

It should be noted that the following impressions of the data are elicited from a small number of faculty and administrator perceptions and, as such, are not necessarily representative of the field.

E2. Publishing models; the needs of the discipline and how the publishing model fits these

E2.1 Perceptions of traditional and non-traditional forms of communication and publication

Perceptions of traditional forms of communication and publication

The standard forms of publication within English-language literature vary by specialty and include monographs, journal articles, chapters in a volume of collected essays, and multi-author volumes. English-language literature scholars often rely on presentations at various forms of conferences (both plenary lectures or panel presentations), as well as visiting lectures at campuses, including colloquia and symposia, as a way to communicate with their colleagues and share their scholarly work. While the trend is towards smaller, more subject specific conferences, larger conferences still play an important role in community-building that is essential for advancement.

Perceptions of non-traditional forms of communication and publication

There has been little shift in publication practices in English-language literature, although many print journals have online versions now. While online-only journals exist, they are rare, and not used widely.

No faculty who we interviewed has published in exclusively online publications. One established professor thought that younger scholars might be using these, though another interviewee noted that:

> There are some online journals…there's at least two fairly reputable online journals in romanticism that people publish articles in and they really work as the equivalent of online scholarly journals. These are ones that are just based online. My notion from them is that I think people are less likely to publish an article there if they can get it to appear in a print journal.

Interviewees commented on the usefulness of online published works, the variety of online archival/library resources (e.g., manuscript repositories), and online tools such as search engines (although one interviewee thought Google, while convenient, could not replace the usefulness of library tools especially when used with the assistance of a librarian). Having original documents, maps, performance works, and other visual documentation either online or in portable electronic formats like CDs has been very beneficial in conducting research and making otherwise rare or difficult-to-access materials more available. At this time, preprint servers are not in use in this discipline primarily because the nature and viability of the research is measured in years not minutes or hours.

Faculty in English-language literature are much more likely to utilize newer modes of communication, such as email and Listservs, for sharing ideas. Blogs also exist, but none of our interviewees used them. Newer forms of communication often replace or extend the in-person conversations that traditionally occurred at conferences, according to one librarian who subscribes to a Listserv in the field:

> I see people trading ideas, grad students, faculty members, getting in and asking questions, and people just bouncing ideas off other Listserv members. Of course. that's not a finished product, but it is a way of forming or joining a community and getting information, or just trying out ideas.

E2.2 Publishers, publishing models and accessing new publications

Publishers

Because English-language literature is such a fragmented field, publisher preferences (based primarily on prestige) tend to vary by subdiscipline and even within specialized fields. The reason is that, as one interviewee concluded, "there are too many different discourses going on that are not easily translated." The choice of publisher also depends on the goals of the press, the editor, which series are currently being published, and other factors that tend to vary annually. One faculty member described the current publishing situation this way:

> The designs of the press usually don't match up in any particular way with the needs of its various constituencies. And as more and more university presses are forced to respond to market forces, they're losing the cushion that they've had either through university subsidies or from subscription…Then it's less and less clear that there's a bright line of university press, scholarly press, or non-scholarly press.
>
> The most recent MLA [Modern Language Association] president…actually made this a point of policy. And this is the sort of squeeze on presses, when you simultaneously have more and more universities demanding more and more publication at a moment when you have fewer and fewer outlets for publication, that are creating the structural impasse which can only be disastrous as it unfolds.

Publishers within English-language literature tend to be primarily academic presses. Though these varied by subspecialty, Princeton, Chicago, Cambridge, and UC Press were most often cited. Commercial publishers are rare within this discipline and, as a result, many academics were suspicious that

commercial products are poor in quality. This is especially true of monographs such as biographies, and there is often "frustration about the fact that people who are in positions to get those kinds of [commercial] contracts are not the people who are actually most informed in the subject."

The choice of journal outlets depends on many of the same factors. Two journals, *Critical Inquiry* and *PMLA*, were mentioned as "generalist" publications for the discipline, although faculty tend to publish in journals that are highly specific to their areas of specialty, and there is little to no overlap between specialties. As one interviewee described it, English-language literature has primarily "boutique" journals, which focus on very specialized topics with low circulation rates.

Journals tend to be published by academic presses, universities, and scholarly societies, and again, commercial publishers are rare. The main journal within any subspecialty becomes important chiefly because it publishes a year's work in every year. Scholarly societies appeared to play a large role in publications, although one faculty member voiced this opinion:

> A scholarly society is in some ways an antiquated term…the MLA is basically sustained by the fact that it's where interviewing for jobs happens. I mean, were it just a conference, would anyone really want to go anymore? And so to the degree that professional societies…tend to be constituted more as affinity groups than anything else… Those aren't so much determinant institutions, they're just self-elected clusters. And useful to a degree that you can see some representation of the field in a way that you can't otherwise. But the idea that it is solely through such institutions that production happens is probably an old one.

Publishing models

Open access. Only one interviewee was aware of open access publication models at the time of interview, although once explained, interviewees felt as though this model would be beneficial both for scholars and for the "public good." The question of financing was perceived as the obvious hindrance with some type of subsidy an obvious necessity for long-term viability. Some interviewees felt as though universities should incur that cost, while others thought that scholarly societies might be able to bear the financial burden by converting print journals and bibliographies to online-only versions.

> It seems to me that there ought to be a way for [open access publications] to be subsidized…I pay dues in MLA every year, as does every other of the ten…twenty thousand, you know, it's a huge organization. And they put out bibliographies that are very thick and… there's no reason…you just put them online, you know, and they could use the money that they're using to publish them to make them open access online, it seems to me. I don't know what the numbers would be. But their money would be better spent that way, because absolutely nobody in my profession, anymore, works without a computer. I mean… nobody has a…there's not a typewriter in the whole building, you know. So, there's hard copy that gets passed around, say, for when you're proofing a publication text…but, otherwise, all articles, all the manuscripts are electronic.

Author-pays. Interviewees responded negatively to the author-pays publishing model. Many saw it as a reinvention of the vanity publication, in which a scholar simply pays, more or less, to advertise his or her work. All faculty interviewed perceived this as contradictory to the peer review process. More than one faculty member expressed concern about who would be responsible for submission fees. The author-pays model could be problematic on a larger scale, given that submission fees would likely be paid by departments that have differential funding and grant availability (humanities research, unlike science research, is generally not grant driven):

> [The author-pays model] would just simply reinforce differences in institutional support, you know, differences between and among universities, between and among disciplines, and would, in

> all sorts of ways, just re-express an infrastructure that actually has little to do with how work gets done in the English department at least…
>
> This is a model where you're basically substituting the fiction of an economic transaction for the fiction of publication, so the core question would be whether that still amounts to publication, and how that would make its way felt through academic protocols would be a real problem.

Accessing new publications

Scholars typically access new English-language literature publications in print (for monographs and large volumes) as well as online (for journals and other smaller publications). One interviewee, however, reported that s/he does not view any publications online simply because s/he finds online reading difficult and therefore subscribes to one print journal. The department subscribes to some journals and there is a departmental reference library. Other interviewees access journals online or order them through a library document delivery service.

Faculty knew that library subscription rates are significantly higher than individual rates and generally had the perception that continually increasing rates were problematic. Prices also depend on the circulation rates of the journal and range from the hundreds to thousands of dollars per year. Interviewees noted, however, that journals in this discipline were much less expensive than journals in the sciences. One interviewee pointed out:

> What's expensive in the Humanities are great big text databases, partly because great big commercial publishers, mostly European, mostly the ones who also do science—Thompson Gale, Rebholtz—those are guys whose hardcopy you can't afford…And they count on electronic dissemination, but they also really hold up research libraries for thousands of dollars a year subscription. Now it saves the libraries having to figure out where they're going to put their one print copy of something. I mean, everybody still wants this now, and they should, but the ones that are really doing the highway robbery are these big scholarly databases and it's a little bit like the way that the medical and biological journals hold up medical schools because they think they can.

E2.3 Perceptions of data storage and preservation

Types of data produced

Because of the nature of the discipline, data produced in English-language literature are typically text, although some subdisciplines may have need to reference visual materials such as artwork or moving images (e.g., film) as well.

Data storage and preservation arrangements

Arrangement for data storage and preservation among English-language literature faculty vary by individual. Typically, files are backed up on the most common mode of portable storage, e.g., CDs, external hard drives, or portable flash drives. Others email files to themselves so that a copy remains on the University server temporarily. Faculty members commented that they also had several antiquated storage devices holding their files, such as floppy disks of various sizes and zip disks.

Departmental support for data storage and preservation is minimal. One interviewee commented that departmental servers were primarily intended for administrative purposes, not academic support. Another faculty member thought that UC Berkeley was somewhat unique because UC Berkeley "has far less built-in common storage space, in a sense, than most do…most places, one has space set aside on a little server which is built-in as backup storage."

Interestingly, one faculty member noted that outward expressions of data management seems to reflect scholarly commitment:

> The prestige item of choice with my younger colleagues is one of these little [USB drives], you know, cloth chains around your neck…That shows you're serious. You take your [work] home, you load it to your computer there…

Data storage and preservation guidelines

Neither departments nor funders provide guidelines for data storage and preservation. Typically national funders might request a copy of a published work (usually in print format) to be forwarded to an affiliated library upon completion of research, but there are usually no requirements beyond that.

Generally, faculty thought that they could use some assistance in preserving files. One faculty member suggested that a departmental conversation to address these concerns would be beneficial, especially as much scholarly work occurs in electronic form.

E3. Driving forces behind why faculty publish where they do

E3.1 Advantages and disadvantages associated with newer forms of communication and publication

Perceptions of advantages associated with newer forms of communication and publication

Printed works, especially books, maintain some degree of sentimentality in English-language literature, but more so, there is "the feeling that the medium in which we, ourselves, construct our arguments is book-based and the book is the…codex, a piece of technology that's developed over centuries, and is very, very sophisticated and reader-friendly."

Though faculty generally prefer printed resources for reading linear text, most agreed that there are some kinds of scholarship for which electronic media are especially appropriate. For instance, manuscript comparison (by version) and maintaining and updating text notes are both beneficial. One interviewee could envision print-on-demand publishing for literature that is more obscure. This would be especially useful in a discipline like English-language literature that has so many subspecialties. Electronic documents also aid scholars in searching, transporting, and disseminating their work. Such advantages are viewed as potentially facilitative.

Faculty agreed that online and electronic forms of communication and publication are very useful because they increase accessibility. Interviewees saw the internet as particularly advantageous because "without the Web, you would have to travel to different archives in different countries to compare these. So the Web could be great as an archive underlying scholarly editorial projects." It is now easier to "get your hands" on material, but this also requires increased sophistication in finding needed resources, as one librarian pointed out:

> You can get 4,000 hits [on Google], so you have to learn to search in new ways. One drawback that I see is the sort of reliance on Google, by students, and to a certain extent by faculty. It's easy, and maybe they're not getting the best material. I do a lot of library instruction for classes, especially in English, and inevitably students are just amazed at all these scholarly resources that the library subscribes to, because all they've ever used is Yahoo or Google. And even the faculty, they can't keep up with all of them. They can't. They're too busy…So there's more and more out there, but it's harder and harder to keep up with them all….

A faculty member agreed:

> I think the Web has…probably affected the way we do research more than we would like to admit. It's certainly affected our students, our students' research…Undergraduates, on the whole, will not bother going into the library. They get everything now off the Web. So and that's something as instructors, as teachers, we have to come to terms with when we're teaching them research skills—both how to maximize those electronic skills, but also reminding them that libraries still contain certain kinds of information that are not necessarily available. So that's changed, and, therefore, the status of libraries in relation to our work has changed somewhat.

Faculty perceived newer modes of communication to be particularly advantageous for scholarly interaction:

> The ease of communication through Listservs and email and so on means there are more conferences. Scholars…we're much more able to talk to each other, and I think that's changed the way we think of ourselves. It's had a democratizing affect… It's no longer so clear as it was that there are a few centers of excellence… I think it means that even if you are teaching at a liberal arts college out in the middle of Nebraska, you can still be in a very immediate kind of conversation with your peers somewhere else and share knowledge.

Perceptions of disadvantages associated with newer forms of communication and publication

Faculty and administrators maintained reservations about the quality associated with electronic work because of popular perceptions that there are not sufficient institutional filters in place. As one faculty member stated:

> People still have reservations about the quality associated with electronic work, because it's perceived that there aren't sufficient institutional filters in place…and the filtering system is an important one in the scholarly world, because it's a way of ensuring quality and ensuring that the important things get recognized.

These perceptions are likely reflective of the newness of electronic publication. As electronic modes of publication become more prevalent, it will be interesting to explore potential changes in such perceptions.

The only disadvantage associated specifically with newer forms of communication mentioned during the interviews was the difficulty of reading print on screen. As a result, several faculty explained that they read the hard copy originals or printed pages directly from their computer.

E3.2 Factors influencing choice of publication venue

Making a name for oneself both nationally and internationally

Because English-language literature is a discipline with so many genres, scholars become established most often in a subspecialty, not necessarily in the broader discipline. Yet making a name for oneself is a complicated matter. Generally, faculty agreed that both presentation at important conferences and publication in relevant journals and academic presses are integral to making a name for oneself in his or her field. In both cases, a scholar's work requires originality in approaching his or her topic or field, striking out into new fields, or producing some "ground-breaking" ideas.

Publication is critical for scholarly success, and it goes beyond the type of media in which a faculty member publishes. Peer-review and marketing are essential; as one interviewee explains, "it matters *who* you publish with, and it matters even more whether your colleagues…like what you're doing."

Becoming well-known among senior academics is important also because "there are leaders, people whose opinions really seem to matter, in every one of these subfields…so when those people start talking about a young and upcoming person in this field, then people really start to notice." For junior faculty, conferences are necessary, but not sufficient, for becoming well-known, though relationship-building (discussed below) does play an important role in advancement.

For well-established scholars, there is theoretically less pressure to attend particular conferences or publish with major journals or presses. In practice, however, scholars who have already made a name for themselves are invited often as keynote speakers to conferences, or continue to publish with prestigious presses or journals. While there is some inclination among senior scholars to engage in "cross-over" publishing with commercial publishers, and some top names in the field have done this, there is concern that academics might risk losing scholarly credibility.

The requirements for advancement with regard to publication

Norms for advancement vary within English-language literature or as one faculty member put it, "they vary wildly." While the terms of advancement within the discipline as a whole or within any individual subspecialty are not explicit or quantifiable, faculty appear to be quite aware of what is required to advance within the institution.

Faculty are expected to publish a book with a major university press—or at least have a contract—as well as some articles, in order to earn tenure. As one faculty member explains:

> In most places a book is non-negotiable, sometimes two… But such things would never become something explicitly contractual…there are always exceptions…in every case and there are variations in departments, from department to department, certainly differences among universities… I think across the discipline at large, it's a book-based discipline. And you start from the book and add various ideas of longer intellectual projects.

Beyond tenure, advancement depends upon another major piece of work, usually a second book. The monograph is, overall, the "gold standard" in English-language literature, although not all faculty interviewed agreed that this should be the case.

> There are brilliant scholars and critics whose natural genre is the essay, and who could publish ten or fifteen really important essays that change the terms of discourse, but never write a book. So I don't think [the book] should be reified to the extent that it is, I really don't... I think a lot of people that I've known over the years in the profession would have been much better off if they were allowed to continue doing essays, critical pieces, than having to gather it all into a book and twist an argument.

> There are probably real questions to be raised about the fairly narrow understanding of what a book looks like...that it's a monograph with this many chapters, argued in a certain way. I mean that's probably ultimately stultifying, like every other institutional pattern that is imposed.

Despite varied opinions about publication standards, at least one administrator felt that, in comparison to comparable institutions, UC Berkeley provided a better overall experience for faculty:

> Some of our peer institutions like Yale or Harvard, they have a practice of practically never tenuring anybody, and they also have a two-book requirement for tenure…there's no guarantee. Whereas, in Berkeley, we actually pride ourselves in the fact that…when we hire somebody as a beginning professor, we hire them with the expectation that we will tenure them…that they will develop within the community, and that if they do the work, they will get tenure. I think it's been a

> very good thing for our department. So we haven't had these ridiculously unrealistic expectations. I mean, they're demanding and rigorous, but they're realistic.

Advancement is also dependent upon building good relationships both within the department and within the field in general because "the more people you know, of course, beyond the confines of the department …the better your chances are of getting positive reviews." Conferences often play an important role for junior faculty in establishing themselves, as one administrator explains:

> For our more junior colleagues, conferences are an important way of gaining access to the wider scholarly discussions in the profession, meeting other people. It's often the first medium in which you bring your work out into public. Typically, somebody will read a conference paper, and then it would be revised for publication as an article, and then it may be a chapter of the book, that kind of thing. More senior scholars will often be invited to a conference to give one of the main keynote lectures, that sort of thing. And the range of conferences varies from the most general… and the example would be the Modern Language Association Conference at the end of every year, which is a huge event. It's also the main hiring fair in the profession. Our junior professors go to MLA to get job interviews and to be hired, but it's also an academic conference…

The advancement process and new publication methods: a support or hindrance?

Opinions among faculty varied regarding whether the advancement process hinders or supports the use of new publication methods. Some interviewees felt as though the requirements for advancement discourages faculty from using newer forms of publication, which "reflects some skepticism about the value of the work published in these new forms." They suggested that UC Berkeley, because of its prestige and quality, could still rely on the printed book as the primary standard. They suggested also that newer modes of publication might be more acceptable if the institution were middle-ranked and therefore book publication was an unrealistic expectation, both in terms of advancement and teaching practice.

Another administrator perceived neither support nor hindrance within the advancement process; rather, s/he believed that the process reflects the standards in the field:

> What the Budget Committee does and what the dean does is reflect…on the standards in the field, so as the standards in the field change the dean and Budget Committee will take that into account, but the dean and Budget Committee don't themselves, at least in the Humanities, mandate what the appropriate outlets for publication are.

Whether using new forms of publication should be encouraged or not, one administrator perceived new modes of publication as full of possibility:

> Whether it should be encouraged or not…if it enables work to get published that is valuable and might not be published otherwise because, let's say, of the financial constraints on presses and libraries, then I would say let's encourage it. If it allows work to be published in a way, in formats—and this would be more interesting, I think—that wouldn't be possible in print publication, then I think it should be encouraged. But just because it happens to be a new medium, I don't see any reason to encourage or discourage it. It's just a different. It's just different. I mean, new doesn't necessarily mean better, in that sense, or worse.

Other faculty were more skeptical about the potential of new forms of publication beyond the book standard:

> I think it's not the same thing to write several articles as it is to write a book, so my own view would be that online forms of publication have to take the place of regular academic book publishing. And I think many people feel as I do.

Another faculty member suggested that the Humanities in general have embraced the technological advances in publication primarily on the distribution end, but not in any way that has significantly altered the content or the nature of the scholarly work being produced.[6]

The value of new forms of publication

There is little value placed on new forms of publication, primarily because they are not widely used in English literature. For many faculty, the question is whether or not the publication is peer-reviewed, although that is not the only issue as one administrator explains:

> There's no inherent reason why a document published online needs to be inferior to the same document published on paper. But I think that the opinion of the document published online is that it…hasn't met the standards that are in place in academic publishing in journals and by presses. So it's generally known and assumed that competition to get a manuscript published at presses is very fierce. So built into that process is the understanding that the things that get published are the very best. It's not just that there's peer review, but there's intense competition. I think it's perceived that the competition for publishing online is not nearly as stiff. And that while there may be peer review built into some of these [online] venues, there are others where there's not peer review, and then that it's a medium that doesn't seem to have some of the same constraints and pressures that print publishing does. So I think people sense, somehow… that the competition is not as tough. And I think that's one of the reasons why people think it's maybe not as… it's not as great an achievement.

Interestingly, one faculty member could not envision a scenario in which an academic in English-language literature would present publications in alternative media.

E4. <u>The evaluation of traditional and new forms of communication and publication</u>

E4.1 Recent or current changes to the faculty reward system

Faculty, in general, were not aware of any changes to the faculty reward system to accommodate new forms of publication, and most doubted potential changes in the near future. One interviewee was concerned, however, that encouraging the use of newer publication outlets might somehow be unfair because it might devalue conventional modes of publication.

E4.2 The evaluation of new forms of communication and publication

Faculty agreed that any new forms of publication would require rigorous evaluation similar to evaluating traditional modes of publication, essentially peer review. "What one is more likely to see is the sort of metaphorical application of old, old habits and standards into new spaces."

Such work would need to be assessed based on quality and importance, and one interviewee also suggested devising some way to assess the stability of the material so that it would be readily available in

[6] "I think in the humanities at least, a place where technologies have made a difference is in distribution. I don't know that it has substantially changed the content. But you know, the same is true in teaching. I'm sure there are people who've sort of fabulously re-imagined pedagogical methods based on available new technology, but if you're trying to teach poetry, the only difference is you might send out an email rather than announcing something in class. What are you going to do on one of these internet spaces, post the same syllabus that you would once have handed out as paper? That's not a significant change…"

the future. They were concerned that websites and other online resources have no clear line of authority or guarantees of ongoing web presence.

> You also never know when a library is going to deaccession a book or when it's going to go out of print. But for the most part, you know, in the world of research libraries there has been a degree of permanence in these collections, so that 20 years later you can go back and find the same thing. That's a real problem with online publication, I think.

No new types of assessments, excepting the issue of stability, were suggested, although one faculty member could envision "accidental" publishing in this way:

> I can imagine somebody publishing something on the Web and it being so important and valuable that it instantly, you know, gets bootlegged all over the place, and somebody actually publishing it. I can imagine the kind of inverse of the current situation, at which point it has to be reckoned with. There is a point at which, if something is really earthshaking, people are going to react to it, and their reactions are going to get registered somewhere, and, you know, theoretically, eventually, it's going to bump into somebody who's got some authority. But you can see the logical problem. I mean, how would the authority be derived in the first place? There's a real problem with that, especially when you have…a very splintered sort of discourse, so that it makes assessment of work in another field and in other disciplines very difficult.

One faculty member suggested that the dean or provost should convene a department-wide meeting to have a conversation about whether there should be new ways of evaluating scholarly work that might end scholarly dependence on university presses.

E4.3 The process of peer review: deterioration versus improvement

Reponses from faculty varied about whether or not the process of peer review has deteriorated within the past decade. These varied methods of assessment may include: a single editor, a standing editorial board, readers and reviewers (which vary in number, usually from one to three), or blind submission peer review. One interviewee states:

> There are real questions to be raised about the process of peer review, and this may be different by discipline; the idea of what constitutes peer and what constitutes review probably differs by department. An essay on Wordsworth doesn't go through the same process of peer review one would expect in chemistry, where experiments can be replicated. It's a different process when one is trafficking in argument; the deferral to settled authority assumes an authority that may not actually exist in an argument culture. If you don't have a solidly hierarchical field, then you're projecting a hierarchical model where it doesn't fit. In most cases, it's probably true that there's no one authority, but a graded series of degrees of reputation in which most people think someone probably knows more about something than anyone else.

One administrator perceived a slight deterioration because some university presses rely on a single reader rather than multiple readers, and making such a "life or death judgment" on the basis of a single review seems problematic. Similarly, s/he is concerned about the lack of thoroughness at the presses:

> In my field I have not come across an acquisitions editor who has actually ever read any of the books that he or she has acquired. That, I think, is sort of a problem. I can see that they don't have a lot of time, but somebody, it seems to me, should be doing more reading at the university presses.

Another administrator believed that it is more difficult to find reviewers due to increasing time constraints and this has resulted in review opinions that "are not as good as they used to be."

> I think it's mostly deteriorated...more and more people feel they don't have the time to do peer reviews...it's more and more difficult to find reviewers... When you're seeking people to do peer reviews, you're forced to go lower and lower and lower on your list of possible reviewers.

This was a difficult topic because the discipline itself has changed significantly.

> Twenty-five, thirty years ago, English was a much more monolithic discipline, not as traditional, historical fields of kind of works and approaches. So I think… it was much easier to find either a single standard of assessment or a very coherent cluster of standard assessments. I think that's no longer the case. I think you have this huge array of fields and methods and approaches, and, therefore, different ways of reading and judging them, but I don't think that at all necessarily means a shifting of quality.

There is also an "increasingly entrepreneurial spirit" that has resulted in more collaborative volumes where one individual decides to put together a volume of essays and invites specific academics to contribute. That individual along with the press editors serve as peer reviewers. But the issue is that the collection is pre-screened.

E4.4 The reward system and publishing practices: advice

When asked to suggest changes to the current reward systems or to newer means of publication so that they mesh better, advice varied among faculty interviewed. Two faculty suggested that the book standard should be questioned, primarily because books are not economically sustainable. Several faculty interviewed suggested that more clarification is required with regard to newer forms of publication through "insistent and substantial statements that electronic publication will not be undervalued." This administrator also expressed concern, however, that electronic publications should not be rewarded or overvalued simply because of the medium.

Many faculty members commented that "one size does not fit all" and that the real tension may lie less with the technology than with the fact that it is not possible to determine a single standard across fields. "Each discipline is constituted according to its own logic, so when you have a problem identifying the logic of a discipline there might be trouble in attempts to solidify standards in lieu of an ability to understand how other disciplines work." The extreme differences among subspecialties within English-language literature demand different assessments and faculty agreed that they rely on experts and maintain, to some degree, the process that exists. "We do this the old-fashioned way. We don't count it. We read it. And that's going to continue to be true."

One interviewee suggested that the current system of evaluation needs no advice for change *per se*, but should follow the advice and standards that emerge from each field:

> I think the Budget Committee is seeing what the problems are with scholarly publication in the Humanities… It's not proposing a solution itself, it's waiting to see what the field does, and I think that's appropriate. In other words, I don't think it's up to the Budget Committee to say to the fields in the Humanities, "you now need to start evaluating in a different way." I think the consensus has to come from the field. Otherwise it really has no authority.

Another faculty member echoed this concern:

> The current book-based criteria for publication and advancement [are] unsustainable economically across the profession, so I think that has to be rethought and revisited and not just on an individual college level but more coherently. Through a professional organization like the MLA…that conversation has begun, though it hasn't gone very far… I do think that those institutions that can afford to retain that economy will do so, like Berkeley… and others, Yale, Princeton, Stanford, etc., will probably continue to do so. That's not necessarily just reactionary elitism and exceptionalism. I think there are good reasons why we would continue to do so. I think the system we've evolved actually works well for us. I think we would have to rethink what we do, though, in relation to the wider world. I think it would be a problem if we went along in a bubble. It would be a problem if we became part of that kind of massive division of the few elite research universities and the rest.

E5. <u>An editor's perspective</u>

Five of the faculty interviewed were editors at the time of the interview, or had been editors in the past. As a group, they have edited a book series, collections of essays, and literary texts, including popular classroom editions. One editor was also involved with several apparatus of textual variance and explanatory notes. They have participated on editorial and advisory boards of both online and print journals, and one faculty was also a reader. In particular, one editor noted that s/he could envision some materials eventually going online, such as glossaries, textual emendations, and explanatory notes.

When looking for a press or journal, two editors suggested that faculty—especially junior faculty—need to look for a venue that has interests consistent with the specific topic. Also, seeking out an efficiently run press can save a lot of time. Likewise, one editor suggested that while it is better to publish in the most prestigious press possible, there are some presses that might not have the glossiest names but are well regarded among people who are known to be doing important work in certain fields.

It's often difficult to find reviewers who are qualified, neutral, and objective scholars in a fairly closed academic community. Another potential burden for editors is the ability to deal with reviewers' schedules and available time:

> A good editor will…find somebody who will be efficient and will do it on time and will produce useful feedback. And I've been lucky in my encounters with reviewers, but I know lots of cases where books have either been delayed for a long time… That's where I think the publisher and the editor can play a crucial role in just keeping the process moving quickly and just knowing a bunch of reliable readers that they can go to and have them assess the work in a competent way… That is a crucial process and it can be sometimes the weak link for the publication process.

Though one editor suggested that time constraints often made an editor's job difficult, another editor did not consider the communication responsibilities a burden. The ability to circulate short pieces (essays, the prospectus or abstract, sample chapters of books) online works very well.

> The submission process, the process of the initial review, reviewing a prospectus, reviewing a sample chapter, online is much, much less cumbersome and easier than putting things in envelopes and mailing them out.

Another editor does not believe that peer review will be particularly affected by the newer modes of online publication because "the structure of assessment evaluation can be in place, whatever the eventual medium of publication."

E6. The state of e-publishing in English-language literature

E6.1 Current scholarly practices

In English-language literature, the standard forms of publication are scholarly monographs and peer-reviewed journal articles, with at least one of the former and several of the latter required for tenure.[7] Increasingly, some books and especially journal articles are available online; a few book presses and journals have become entirely digital. At the same time, some scholars and research groups have begun creating digitally native hypermedia archives, electronic scholarly editions, and interactive digital projects that represent emerging literary research practices.

E6.2 Emerging scholarly practices

Through massive digital conversion projects, vast quantities of literary text are now available electronically. Some, such as Project Gutenberg or the Google Library Project, provide open access to tens of thousands of titles whose copyright has expired.[8] Subscription-based services such as NetLibrary and Literature Online (LION) provide libraries with access to hundreds of thousands of published titles.[9]

Scholars can use a range of computer-enabled tools in order to open up digitized texts to new forms of analysis.[10] Several such tools exist: for encoding and searching texts, for statistical or computational analysis, for annotating and comparing across texts, and for live interaction.[11]

The Text Encoding Initiative (TEI) has produced widely adopted guidelines for encoding digital texts. Based on SGML, the TEI markup allows texts to be searched in many ways, such as by keyword, phrase, frequency, and type of enunciation.[12] Other tools add analytic capabilities from computational linguistics: the National Institute for Technology and Liberal Education (NITLE)'s Semantic Engine can find, for instance, which characters marry in a Jane Austen novel.[13]

Other tools allow scholars to compare and annotate texts. NINES, a project of the University of Virginia's Institute for Advanced Technology in the Humanities (IATH), includes a software program called Juxta that puts multiple texts side by side, highlights their textual patterns for easy comparison, and allows users to make annotations.[14] Northwestern University's recently released Wordhoard combines several

[7] The field's professional association, the Modern Languages Association (MLA), and some leading faculty have begun calling for reform: in tenure, in cost structures, and in attitudes towards electronic publishing. Some recommend that tenure requirements shift to articles rather than books. Others recommend that universities subsidize university presses to allow them to publish all that they should. For example, universities could contribute to a national subsidy pool in proportion to how many publications their faculty seek (Davidson 2003, Monaghan 2004).
[8] http://www.gutenberg.org, http://books.google.com/googlebooks/library.html. In 2005, the European Commission announced its own effort to digitize six million texts and cultural works by 2010.
[9] http://www.netlibrary.com, http://lion.chadwyck.co.uk. Their services also include e-content delivery platforms and research tools.
[10] The ACLS's 2005 report on Cyberinfrastructure in the Humanities and Social Sciences refers to discipline-specific "data-mining."
[11] Based on categories in Unsworth (2000) and Brogan (2005).
[12] http://www.tei-c.org
[13] http://www.knowledgesearch.org/projects.htm. Another example is the University of Illinois's Nora Project, http://www.noraproject.org.
[14] http://www.patacriticism.org/juxta. The William Blake Archive website has a Java program called Inote that allows similar functionality for images, http://www.blakearchive.org

tools: it tags digitized texts according to multiple linguistic criteria, it analyzes them statistically, it allows users to display passages side by side, and it includes an annotation module.[15]

In a different vein, programs such as IATH's Ivanhoe game and Patacritical Demon create virtual environments where users can play creative games with literary texts and interact with their own and others' interpretations.[16] Sites such as IATH's Temporal Modelling Project and the Annenberg School's Labyrinth Project are real-time multidimensional digital spaces where users engage experientially with a scholarly theme: temporality and storytelling, respectively.[17]

Finally, emerging media can themselves be objects of literary and cultural analysis. Scholars have turned their critical attention to cybertexts, such as N. Katherine Hayles on textuality and embodiment in digital media, and Marie-Laure Ryan on electronic texts and narrative theory.[18] The Transliteracies Project at UC Santa Barbara is an interdisciplinary group of scholars that study the new literacy of online reading and work on tools for better online reading.[19]

E6.3 New publishing venues

E-publishing in English-language literature ranges from traditional print-like forms to innovative digitally native sites that correspond to the emerging scholarly practices above.[20] The Modern Language Association (MLA) 2002 report on "The Future of Scholarly Publishing" reports its members' ambivalence towards electronic publishing. The chief fear is that electronic publications are not peer-reviewed and are hence less prestigious and "tenure-worthy" than their print counterparts. Efforts are underway to change this (often erroneous) perception. In 2003, for example, the MLA issued a statement that electronic publications are a "viable and credible mode of scholarly publication" that "should be judged according to the same criteria used for a print journal."[21]

Online Journals

There are now dozens of online-only open access peer-reviewed journals of English literary studies indexed in bibliographies such as the MLA's.[22] Some journals, such as *Postmodern Culture*, the oldest

[15] http://wordhoard.northwestern.edu

[16] http://patacriticism.org/ivanhoe, http://www.patacriticism.org/projects.html.

[17] http://www3.iath.virginia.edu/time/time.html, http://www.annenberg.edu/labyrinth/laby.html. See Schreibman, Siemens, and Unsworth (2004) for more on the implications of interactive media for literary studies.

[18] Hayles won an American Comparative Literature Association book award for her 1999 *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature and Informatics*, http://www.english.ucla.edu/faculty/hayles. Ryan has won two MLA book awards for her 1991 *Possible Worlds, Artificial Intelligence and Narrative Theory*, and her 2001 *Narrative as Virtual Reality: Immersion and Interactivity in Literature and Electronic Media*, http://lamar.colostate.edu/~pwryan/indml.htm

[19] http://transliteracies.english.ucsb.edu

[20] As Waters puts it (2005), "as scholars learn new ways of interpreting evidence and the scholarly record, they will be learning new ways to write and will need tools and processes to assist them and to make dissemination throughout the academy easier and affordable in discipline-appropriate ways."

[21] This call has been echoed in other recent publications and reports, for example the Association of American Universities' Reinvigorating the Humanities (Mathae and Birzer 2004). The MLA has also created guidelines for departments and faculty to explicitly clarify the role of digital scholarship in tenure cases (2002). A panel was convened at the 2005 MLA to discuss future directions (Jaschik 2005, Howard 2006).

[22] The Directory of Open-access Journals lists 72 entries for Languages and Literatures (http://www.doaj.org), and the Humbul Humanities Hub lists 156 online resources in English studies, many of them journals (http://www.humbul.ac.uk). Brogan (2005) mentions *Postmodern Culture*, *Americana: The Journal of American Popular Culture*, and *Early Modern Literary Studies*.

and most established peer-reviewed electronic journal in the humanities, approximate the look and feel of hard copy journals, altering only the mode of distribution.[23] Other journals, such as *Vectors, a Journal of Culture and Technology in a Dynamic Vernacular*, fully embrace the digital medium: they publish articles that use animation and hypertext, and organize pieces according to themes and links rather than volumes and dates.[24] Some traditional print journals have started an online-only component; one of the best-known American literature journals, the *American Quarterly*, has put out a call for digitally-native papers.[25]

Electronic Books and Dissertations

A few presses now offer electronic versions of single-author monographs in English-language literature. Several dozen such titles from Princeton University Press can be purchased and downloaded through an Amazon e-bookstore; Taylor & Francis/Routledge offers hundreds of titles to libraries and individuals via subscriptions or single downloads.[26] The California Digital Library's eScholarship Editions makes select UC Press books, including around 100 titles in this field, available electronically; some are open access for the general public.[27] Several organizations, such as ebrary and the University of Chicago's BiblioVault, offer back-end infrastructure that publishers can use to create and distribute electronic books through print on demand or library subscriptions.[28] Dissertations are made available electronically and print-on-demand through the University of Michigan's ProQuest Digital Dissertations.[29]

Digital Editions, Collections, and Archives

Documentary editions have lent themselves especially well to digital publication: electronic archives and digital collections offer searchable, hyperlinked, and multimedia archives of an author's complete works, or a particular research area.[30] An often-cited example is the Rossetti Archive, edited by Jerome McGann at the University of Virginia.[31]

Some sites combine the multimedia archive format with features of traditional print publishing. The William Blake Archive has won the MLA book award for a Distinguished Scholarly Edition, and it has given rise to several traditional-format books available electronically on the site.[32] The University of California's Mark Twain project publishes electronic editions of his letters, available via Amazon or ebrary.[33]

[23] http://www3.iath.virginia.edu/pmc. Another example is *CLCWeb: Comparative Literature and Culture*, http://clcwebjournal.lib.purdue.edu.
[24] http://www.vectorsjournal.org. Other examples are the *Electronic Book Review* http://www.electronicbookreview.com and the *Digital Humanities Quarterly* http://www.digitalhumanities.org/dhq.
[25] Brogan (2005); http://www.americanquarterly.org
[26] http://www.pupress.princeton.edu/ebooks.html, http://www.ebooksubscriptions.com, http://www.ebookstore.tandf.co.uk
[27] http://content.cdlib.org/escholarship
[28] http://www.ebrary.com, http://www.bibliovault.org. Ebrary also licenses libraries a platform to manage their digital content that includes basic text analysis and annotation tools.
[29] http://www.il.proquest.com/products_umi/dissertations
[30] Indeed, in 2002 the MLA's Committee on Scholarly Editions began maintaining guidelines and quality controls for electronic scholarly editions in addition to print ones.
[31] http://www.rossettiarchive.org
[32] http://www.blakearchive.org
[33] http://bancroft.berkeley.edu/MTP

The University of Virginia Press has launched an Electronic Imprint to publish Rotunda, the only collection of digitally native works in English-language literature.[34] The Electronic Imprint applies the rigorous peer-review selection process of print books to works that exploit the new technologies of humanities scholarship, such as an award-winning edition of Dolley Madison's letters and life and an interactive online study of a Melville manuscript. Similarly, the University of Michigan's Scholarly Publishing Office is starting an electronic publishing initiative for journals, e-books, and innovative digital collections across several disciplines.[35]

There are some computing tools specifically for creating and sharing digital literary content. IATH's Collex allows scholars to create and present annotated "exhibits," and the Digital Library Federation's Aquifer helps build digital collections that can then interface with digital libraries, content management systems, and e-learning systems.[36] Scholars can also contribute their digital collections to an open access venue devoted to literary studies, such as the EServer at the University of Iowa or AHDS Literature, Languages and Linguistics hosted by the Oxford Text Archive in the U.K..[37]

Community

Several sites have become online hubs for the humanities and literary studies community. Portals such as the Voice of the Shuttle website maintained at UC Santa Barbara or the Humbul Humanities Hub based in the U.K. are directories of humanities resources on the web vetted by editors and by the community of users.[38] *Romantic Circles* is a multi-faceted community of practice for studies in Romanticism. It includes book reviews, scholarly resources, pedagogic guides, a blog and live interactive discussion, a digitally-native journal (*Praxis*), and a searchable archive of electronic collections. Each of these resources is fully peer-reviewed and vetted by the editorial board before it is included on the site.[39]

A recent debate in the *Chronicle of Higher Education* indicates that blogging can be a liability for academic humanists; however, some literary scholars do blog, such as Michael Bérubé, a well-known academic at Penn State.[40] Occasionally, a literature conference such as Interdisciplinary Nineteenth Century Studies creates a website in order to pre-circulate papers electronically.[41] At the 2005 MLA meeting, two sessions on electronic scholarship and publication in literary studies were run as electronic poster sessions (Jones 2006).

E6.4 Institutional support

The MLA's Committee on Information Technology is a hub for supporting computing activities in the humanities and advocating for change in publishing and tenure trends.[42] Many universities have centers that fund faculty work with digital scholarship, including allowances for academic leave and course relief.

[34] http://rotunda.upress.virginia.edu, http://www.ei.virginia.edu. Initially funded by the Mellon Foundation, the Electronic Imprint is experimenting with different cost-recovery models; for the moment, they are charging libraries and individuals for access to each publication.
[35] http://spo.umdl.umich.edu
[36] http://www.iath.virginia.edu/tools.html, http://www.diglib.org/aquifer
[37] http://eserver.org/, http://ahds.ac.uk/litlangling
[38] http://vos.ucsb.edu, http://www.humbul.ac.uk
[39] http://www.rc.umd.edu *Romantic Circles* will soon become part of *Nines*, a larger project based at the University of Virginia to oversee peer-reviewed collaborative digital projects for nineteenth century British and American studies. http://www.nines.org
[40] http://chronicle.com/weekly/v52/i02/02c00301.htm, http://www.michaelberube.com. Several blogs on literature for a wider audience can be found at http://crookedtimber.org/category/literature
[41] http://english.rutgers.edu/conferences/incs2006
[42] http://www.mla.org/rep_it

Many centers also provide technical consulting and support for digital projects (for example, Brown University's Center for Digital Initiatives and Scholarly Technology Group, or UC Irvine's Humanitech).[43]

A few universities have funded more ambitious think tanks and labs where humanists, artists, and information technology specialists work together to develop cutting-edge tools for emerging digital humanities scholarship. Such centers host fellows, workshops, and conferences. The University of Virginia's Institute for Advanced Technology in the Humanities (IATH) is the best known.[44] It hosts NINES, a scholarly collective that aims to be an institutional home for all electronic work in nineteenth century studies.

Finally, there are some national organizations devoted to supporting and advocating for technology in the humanities, such as the Humanities, Arts, Science, and Technology Advanced Collaborative (HASTAC), the Alliance for Digital Humanities, and the Electronic Literature Organization.[45] In Canada, the Text Analysis Portal for Research (TAPoR) is a national organization building a centralized "human and computing infrastructure for text analysis."[46]

[43] http://dl.lib.brown.edu, http://www.stg.brown.edu, http://www.humanities.uci.edu/humanitech
[44] Brogan (2005). http://www.iath.virginia.edu Others are the Stanford Humanities Lab, http://shl.stanford.edu the Duke Collaboratory, http://www.jhfc.duke.edu/jenkins/2004build/hpsCollaboratory%20v2.5.html, the Maryland Institute for Technology in the Humanities, http://www.mith2.umd.edu, the Center for Digital Research in the Humanities at the University of Nebraska, Lincoln, http://etc.unl.edu
[45] www.hastac.org, http://www.digitalhumanities.org, http://www.eliterature.org
[46] http://tapor.ca

CASE STUDY: CHEMICAL ENGINEERING

C1. Introduction

C1.1 Background

Chemical engineering is a field concerned with the use of chemistry and other sciences to create, design, and analyze chemical processes and products used for the good of humankind and the environment. Research in chemical engineering can be experimental, theoretical, or computational, or combinations of these. Communication of research results has traditionally been through peer-reviewed journals and national or international conferences, some of which have proceedings. One significant trend over past decades has been a transition from primary applications being in the petroleum and chemicals industries to applications being in many different areas, including pharmaceuticals, environmental controls, polymers, alternative energy, and food, beverage and other consumer products. Another trend has been the growth of bio-processing and biologically oriented products as an area of emphasis. Yet another has been greater prominence of surface chemistry, quantum mechanics, nanosciences, and other fundamental emphases.

C1.2 Profile of interviewees

The interview data are drawn from two pilot interviews and interviews conducted with three faculty members and three faculty administrators, all of which took place between July 2005 and February 2006. Although the field of focus is chemical engineering, two interviewees located in the Department of Chemistry were included in the sample. Where discussion pertains to the latter, this is indicated.

C2. Publishing models; the needs of the discipline and how the publishing model fits these

C2.1 Perceptions of traditional and non-traditional forms of communication and publication

Traditional forms of communication and publication

The standard forms of publication in chemical engineering are archival print publications in refereed journals [at the University of California (UC), these are often available in an online format through CDL] and, to a lesser extent, print publications in conference proceedings. In terms of conventional forms of communication, national and international meetings play a key role, with a trend towards subject-specific meetings.

Non-traditional forms of communication and publication

Faculty reported that non-traditional forms of communication and publication include preprint servers and personal websites on which scholarly works are posted, although the former are not particularly well established (especially when compared to fields such as physics). Faculty also noted that there are not many innovations of newer publishing models emerging in the field; for instance, one administrator stated that there is only one e-journal of which s/he knows (a bepress journal) and this is reiterated by another administrator who believed that such online resources "definitely have not hit home in any areas that I know."

All interviewees reported that they had not made use of newer modes of disseminating scholarly work in their academic careers. Moreover, they perceived that senior academics in the field also had not made use of these newer modes.

C2.2 Perceptions of publishers, publishing models, and accessing new publications

Publishers

In terms of top-flight publishers, journals housed by scholarly societies were the most reputable and prestigious according to a number of interviewees. In addition, *Science* and *Nature* were viewed as particularly selective. Not only are society-sponsored journals usually less expensive than their commercial-based counterparts, there was respect and value associated with journals published by particular societies.[47] Publishing in these venues, according to one administrator, gives "an extra stamp of approval and recognition." Another interviewee was, however, an editor of Elsevier and Taylor and Francis journals, both of which s/he believes are "good, reliable publishers."

Broadly speaking, interviewees identified these as the most reputable and prestigious journals in the field: *Science*, *Nature*, and *Physical Review Letters*. Faculty identified a largely heterogeneous group of journals for specific subfields within chemical engineering including the *Journal of Fluid Mechanics*, the *Journal of Rheology*, *Macromolecules*, *Journal of Non-Newtonian Fluid Mechanics*, *Physics of Fluids*, the *Journal of Chemical Physics*, *Advanced Materials*, *PNAS (Proceedings of the National Academy of Sciences)*, and the *Journal of Physical Chemistry*.

Most interviewees reported that scholarly society journal publications hold the majority share in chemical engineering. The second largest share (possibly even the largest according to one administrator), is held by Elsevier, the biggest publisher of scientific journals in the world. At least one faculty member was unaware of whether several journals s/he had named as prestigious and reputable were published by scholarly societies or commercial publishers so, at least in this instance, the type of publisher did not appear to affect his/her decision in choosing a venue for publication. Despite this, there was reluctance by some scholars to publish with commercial publishers owing to faculty attempts to reconcile their position on commercial journal editorial boards with the knowledge that these same journals were charging exorbitant prices[48] to the library.

One faculty member explained, however, that junior faculty may not have the luxury of selecting a publisher in the early stage of an academic career where the emphasis is on choosing a publication venue with the broadest readership. One administrator pointed out that none of these publishers has page charges anymore, which might have been an impediment to publication in the past. The subscription cost is paid by the university library and, as such, a publisher's charges does not factor into the choice of publication venue.

Publishing models

Open access. It is interesting to note that a number of interviewees required clarification regarding the definition of open access and author-pays publishing models. Some faculty were in favor of the open access publishing model because it permits access to scholarly material by users at smaller universities or companies. Despite this, faculty reported that open access had not made much inroad in chemical engineering because the "old system of publishing" remains the predominant means of transmitting scholarly work, and there are not enough advantages associated with these models to cause people to

[47] For instance, the American Chemical Society.

[48] One faculty member stated that one of the biggest problems facing the academic community is the high cost of journal publication and he cited Elsevier as an example of a particularly "egregious" commercial publisher. Libraries are forced into paying high prices which exceed their collections budget and, consequently, have to cut their journal subscriptions.

rapidly migrate their work. In order to succeed, faculty perceived that open access publishing models need to be university directed.

This lack of awareness of alternate publishing models appeared to be fueled by either disinterest, as was the case for one faculty member, or by the fact that the crisis in scholarly communication has bypassed chemical engineering faculty at this institution. Academics at UC Berkeley do not have to turn to alternative means for either disseminating their scholarly work or for accessing material. As one faculty member reported:

> At Berkeley, we're kind of sitting in the proverbial ivory tower here, because even though there is a budget crunch, we know the university maintains its subscriptions to the top flight journals, which is where we all want to publish anyway.

Interviewees expressed some concerns about the financing of open access publication models, primarily *who* was going to pay for open access; interviewees reported that open access could inflict potential monetary damage to the professional societies since societies currently make money on their journals which is ploughed back into the association. As one interviewee pointed out, the American Chemical Society, in particular, is critical of the open access initiative set in place by National Institutes of Health (NIH).[49]

Faculty also expressed concern about peer review. Though interviewees expressed positive opinions about open access models because they encourage the wide dissemination of scholarly work, they were cautious about accessing open access repositories because, at this time, there are no guarantees that scholarly work has not undergone a rigorous process of refereeing:

> Without peer review or refereeing of papers, there's a great risk of erroneous material getting into the literature, which would mislead or could mislead others who might want to use that for their own research.

Author-pays. Responses from interviewees in chemical engineering were largely negative to the author-pays publishing model. Although one interviewee did not see a problem with this model as long as peer review was maintained, another faculty member stated that s/he would not pay a fee because the money could be better spent elsewhere (e.g., sending students to conferences). In addition, faculty perceived such a model as self-promoting:

> It seems a little odd to me, because it's a little too much like paying to have your work published. It seems to put a lot of the journalistic integrity at risk, whereas when it's the reader pay model, then you're paying for the knowledge, not for the privilege of publishing.

Several faculty pointed out that there are discrepancies between disciplines. Since the author-pays model requires more funding than is personally feasible, money would be drawn from grants, causing problems

[49] It is interesting to note that the President of the American Chemical Society, in her email to ACS colleagues (03/21/06), was critical of the open-access initiative set in place by National Institutes of Health (NIH). In May 2005 a voluntary policy was launched, requesting NIH-funded researchers post their articles on PubMed Central. Currently, the policy states that final, peer-reviewed manuscripts accepted for publication (in journals like those housed by ACS) be posted on PubMed Central on a non-mandatory basis within twelve months of publication. NIH is, however, subsequently concerned with the low participation rate of academics to deposit their manuscripts and, as such, is considering a move to mandatory posting just six months after publication, a move that ACS is against for a number of reasons. The President of the ACS, Professor Nalley, stated that scientific research value exists well beyond a six-month period. In addition, the role played by scientific societies in both peer review and archiving may be undermined if societies have just half a year to recover costs prior to authorizing free access.

for disciplines that have limited access to grant funding. Another interviewee pointed out that that if university repositories were responsible for accepting or rejecting publications, especially those papers submitted by their own faculty, then there might be the potential for grievances and lawsuits. For a University of California peer-reviewed repository, this problem could be mitigated by drawing an editorial board from the ten different campuses that constitute the University of California.

Accessing new publications

Faculty reported that they typically accessed new publications online through a library collections catalog or through a bibliographic database (e.g., the Web of Science or Web of Knowledge). This, in fact, was the biggest change in scholarly practice that faculty perceived: "it's been not so much in how you get it [your work] to the outside world, but it's rather how you bring the outside world to you."

Faculty reported that there are no departmental subscriptions to journals and few scholars receive paper copies of journals, although one faculty member on an editorial board did receive hard copies, and another faculty member maintained a couple of personal subscriptions. One administrator perceived that faculty and students accessed materials differently: while faculty tend to read print journals at home at their leisure, students tend prefer to print a specific article from an online source. This, consequently, means that students often have a narrower scholarly focus.

As explained by one interviewee, chemistry and chemical engineering scholars depend upon a database called Chem Abstracts that indexes all literature in the field by keyword and author. The abstracts are written by readers who know the field and have specific methods for indexing, and, as such, it will be a long time before Google Scholar replaces Chem Abstracts.

When asked to estimate the library subscription price (within plus or minus twenty percent) of the main journal in their field, the majority of interviewees stated that they had no idea and did not hazard a guess, although one faculty member was correct in his/her estimates.

C2.3 Data storage and preservation

Types of data produced

Data produced in chemical engineering vary. One faculty member stated that his/her data are experimental and numerical (from simulations) while another interviewee reported that his/her data take the form of measurements (using instrumentation). In relation to the former, most of the data are published in the form of two-dimensional plots, as well as movies of experiments.[50] Another faculty member explained that his/her group does a fair amount of microscopy and data tend to be of the "pretty picture format" (i.e., color images). A major new direction in chemical engineering (as well as in chemistry and physics) is the amount of raw computer-based data (i.e., computer simulations) attached to papers but archived separately in data archives[51] as a means of curbing the sheer volume of material produced.

[50] Specifically, one faculty member was making increasing use of supporting document sites where a movie can be posted on the Web.

[51] One interviewee also provides a supplement which is published in a separate place because it is not necessary for the bulk journal readership. Should anyone want to know the details in order to reproduce that work, they can do so using the supplemental data.

Data storage and preservation arrangements

Faculty reported that they store data on CDs, DVDs, hard disks, and external hard drives. There is no departmental support and thus faculty make their own data storage and preservation arrangements. As explained by a faculty member and an administrator respectively:

> Maybe what the average person doesn't realize is that I'm running a small business here, essentially, like the department isn't supporting that activity... I'm supporting it through grants and contracts that I bring in, and using that money to hire graduate students or support staff, and hard drives, and CDs and DVDs to archive, and back up that data.
>
> The university provides practically nothing in the way of support for research.

Two faculty members believed that they needed help with storage and preservation of data. One scholar stored all data on his/her computer but would like a standard procedure whereby all course materials are archived. Another interviewee maintained a backup hard drive that updates every two days. One interviewee stated that his/her group has their own archiving system whereby duplicate sets of data in the archive can be recalled easily.

Data acquired during graduate or post-doctoral study are recorded in research notebooks and these have short-term value for a few years. Long-term storage is rarely important for there are few occasions when scholars want to return to a piece of information some years later, although it is possible with digital storage.

Furthermore, the needs for archiving data are very different depending on one's subspecialty. Chemical engineers, for instance, do not generate the kinds of data that require archival storage. Specifically, academics in physical chemistry typically collect significantly more data than scholars in synthetic organic chemistry and, with limited storage, there is only so much data one can archive.

A cause for concern among faculty is the fast rate at which media are evolving, resulting in several archaic formats that can no longer be read such as jazz drives and zip disks.

Data storage and preservation guidelines

Faculty reported that there are some guidelines in relation to how long data should be preserved. For instance, laboratory notebooks should be kept in the event that questions arise at a later date regarding the research. Grant funders, however, did not dictate preservation methods because the locus of scholarly value is in published work preserved in archival copies, libraries, and online. One faculty member mentioned that NIH is creating a database of archival data, though NSF is not yet involved in the preservation of data.

C3. Driving forces behind why faculty publish where they do

C3.1 Perceptions of advantages and disadvantages associated with newer forms of communication and publication

Advantages associated with newer forms of communication and publication

Faculty reported that newer outlets of communication and publication were more useful than standard ones in terms of increased accessibility (i.e., rapid dissemination), availability, and usability.

Interviewees also perceived that newer outlets have a democratizing effect on the peer review of international researchers' work.

Disadvantages associated with newer forms of communication and publication

Faculty perceived a lack of quality control over scholarly work associated with newer forms of communication and publication, though it is not clear the degree to which this was a presumption or fact. In addition, faculty believed that the emergence of newer outlets of publication compounds the volume problem since it promotes dual publication and a proliferation of new journals.

Faculty also mentioned that one serious disadvantage is the fact that traditional journals will not accept papers that have previously appeared in an online format. In addition, in the absence of a journal email alert system, one has to remember to look at content pages when new issues come out.

C3.2 Perceptions of factors influencing choice of publication venue

Making a name for oneself both nationally and internationally

Faculty agreed that to make a name for oneself in chemical engineering, both nationally and internationally, a scholar must: produce scholarly work of a very high standard, make "some major inroad into an unsolved problem and thus establish their reputation," develop "unifying concepts or new ways of thinking about things which help others in the field," and publish in top-flight journals. Faculty also pointed out that having access to data stating how often you have been cited is valuable.

In addition, faculty mentioned that self-promotion is also important. Specifically, junior faculty should attend multiple conferences each year and present impressive work. Doing so ensures that fellow academics are aware of the junior faculty's work (and will subsequently seek it out). Building these types of relationships with peers and senior scholars is important to generate future invitations for keynote speeches. Also, these colleagues will ultimately write letters on behalf of the junior faculty. Engaging in extra activities, such as editing a journal or organizing a conference, also contributes toward making a name for oneself in the field:

> It's doing what's perceived as first-class or first-rate scientific research, and presenting it at technical meetings, national and international technical meetings, and publishing in these first-rate journals. And so you sort of get a reputation by doing excellent work and then presenting it in these forums. And it's very difficult to get a good reputation without doing both things.

> …you should be doing cutting-edge research, which is highly regarded by your peers. So the peer group is the ultimate arbiter of the quality at work. And the peer group judges this on the basis of publications, reading publications. So if your publications are found to be good quality and you have a high number of citations of your work, frequent downloads from web servers—and this is now monitored as well—and if one goes on and asks about a colleague and how well is he or she doing in their work and how are they regarded, then we get letters of recommendation which will verify very quickly what the standard is.

The requirements for advancement with regard to publication

There are no written guidelines for advancement with regard to publication within chemical engineering. According to one junior faculty member, the fact that the requirements are vague is understandable because the process for advancement is "unquantifiable." Another faculty member believed that "if I'm doing my job right, tenure should come along with it. And if not, then something is wrong."

Despite somewhat ambiguous advancement criteria, scholars had a keen understanding of how to gain tenure and rank advancements. In chemical engineering, faculty reported that three or four articles a year is a good rate of publication to initially move up the ladder, and added that attention from another university helps as leverage to advance more swiftly. To promote to full professor, twenty or so papers in major journals are necessary in combination with international recognition. As such, faculty believed that the criteria by which academics receive or are denied tenure is largely based on the perception held by scholars outside of the institution (as opposed to their peers within UC Berkeley).

There is pressure, according to one faculty member, to publish in high-impact journals like *Science* and *Nature.* This interviewee pointed out the increasing importance of the impact factor, although s/he did not agree with the value placed on this measure:

> The impact factor counts, for example, what the publication record [is] of a particular article two years after it's published, that's what I believe. And I don't think two years is an adequate representation of anything. I think if you went and found the impact factor of Einstein's theory of relativity, you would get zero. And to me that's an important paper, so I just don't agree with that.

The faculty we interviewed, with the one exception, consider these requirements for advancement when choosing an outlet for scholarly work. The rationale underpinning their choices of publication venue is based on the reputation of a journal, desired readership, as well as the aim of research dissemination. The latter is a particularly important factor. According to one faculty member, there are some subdisciplines in chemical engineering, such as microfluids, MEMS, and bioMEMS, in which rapid dissemination ensuring proof of concept is particularly necessary, and, as such, conference proceedings are a primary communication vehicle.

Faculty perceived that the reward system therefore acts as a barrier to disseminating scholarly work in newer outlets of communication and publication. Many interviewees believed that the reward system is dictated by more senior scholars whose value system is tied to standard publication forms, which greatly influences the type of publication outlet prioritized. One interviewee stated that s/he would be more likely to pursue newer modes of communications and publication, such as blogs, if such venues were valued by the individuals responsible for his/her advancement.

> I think the standards in my subdiscipline, at least, are such that people don't really attribute… they don't give you much credit for things unless they're peer-reviewed and published in archival journals. That's still the coin of the realm, so to speak. But, again, my subfield is a little bit more conventional and a little, you know, sort of older…more conservative, I should say, not conventional, more conservative than some subdisciplines.

Faculty noted that age may influence publication venue choices, as indicated by this comment from one administrator:

> Particularly younger faculty think about this very hard because they recognize that making tenure, which is the first hurdle in the university, requires that your work be highly recognized in the best journals possible. But even senior faculty continue to maintain the sense of standard. When an article is ready, you think about where you might publish it, and the first thing that comes to mind is, 'Why not put it in one of the best journals?'

The advancement process and new publication methods: a support or hindrance?

Faculty opinion varied regarding whether the advancement process hinders or supports the use of new publication methods. According to several interviewees, the advancement process impedes the use of

newer outlets. Many interviewees felt as though this is appropriate because they did not believe that newer venues have the expertise to evaluate scholarly work, thus providing some form of quality control:

> The community relies heavily on the expertise and the generosity of outside reviewers to help sort of sift through stuff that people would otherwise be publishing all the time in blogs or on websites. So it's an important part of the evaluation process.

Nonetheless, four interviewees perceived the advancement process as neutral; it neither supports nor opposes the use of new publication outlets.

One administrator noted that the medium of publication (i.e., whether electronic and/or open access) is often considered indirectly when reviewing advancement cases. The medium, however, is not a cause for concern because many young assistant professors coming up for tenure have publication records citing the top journals in their field (although there are exceptions).[52] Rather:

> The quality of the journals is considered, but that's about all. You know, there's not a choice of various media. If one only had his or her articles appearing or notes of their research appearing in the *New York Times,* well, that's clever but not cause for advancement.

The value of new forms of publication

Within chemical engineering, the general consensus among faculty was that new forms of publication do not hold the same value as standard forms in relation to advancement. As one faculty member stated, "it's a top-down system, and so the people who evaluate me still place a high value on conventional, traditional publication venues."

Moreover, faculty perceived that supporting newer publication models is risky. This perception was often related to the assumption that newer outlets are not peer reviewed. As one faculty member surmised about a hypothetical scenario:

> I've published [papers] in these open access places and no one ever sees them, so I might just as well not have published them, because it doesn't buy me the respect of the experts in the field, nor does it hold weight with my department. If it did one or the other, it might be worth trying, or at least it would be sane to risk on. I still think it would be a risk. I think I'm still too conservative with my career to do that.

Another interviewee stated that academics should publish in journals that have a degree of recognition and permanence. S/he suggested that journals that are not as well recognized, possibly all-electronic journals, would raise eyebrows as to the worth of the journal. S/he also pointed out that a distinction must be made between the newness of a journal, which may well work as an impediment to prestige and recognition, and issues related to electronic status.

Interestingly, one interviewee drew on anecdotal evidence to illustrate resistance by academics to new publication vehicles. S/he reported that a publisher of free online scholarly journals (bepress) had an agreement to publish the proceedings of a large engineering conference. Attendees were, however, reluctant to publish electronically because of the perception that an e-journal would not only fail to communicate research widely to the academic community, but would not be worth as much in relation to advancement.

[52] There are areas of science in their infancy. In addition, faculty may publish in new undeveloped journals which have to go through a growth period.

C4. The evaluation of traditional and new forms of communication and publication

C4.1 Recent or current changes to the faculty reward systems

None of the academics interviewed, with one exception, was aware of any recent or current changes to the faculty reward systems to accommodate new forms of communication and publication. For example:

> Every few years I get a letter from the chair asking for certain pieces of information, and that letter hasn't changed much. But that's how I would learn that. If the letter said, 'Oh, and if you've got stuff in a blog throw that in.' Yeah, but the letter doesn't say that. But it's, again, it's a very long cycle between my getting these letters, so I wouldn't necessarily know it now if this year the chair is saying anything you publish in a blog is fair game, too.

One administrator explained that there have been changes to accommodate new forms; for instance, the academic senate issued a statement saying there will be no disadvantage to or penalty for publishing in electronic forms. S/he noted, however, that practice can differ from a statement of principles and often depends upon the makeup of each review committee.

C4.2 The evaluation of new forms of communication and publication

Interviewees believed that the evaluation process for any new forms of communication and publication should use identical criteria as conventional methods. Since the peer review system verifies scholarly content, the process should be the same, irrespective of publication medium. In addition, the citation index could also be a useful tool in the evaluation process, although it may be a little misleading because of the time delay between accessing a scholar's work and citing that work in new publications.

C4.3 The process of peer review

Importance of peer review

Faculty returned again and again during our interviews to peer review as paramount in all issues relating to scholarly publishing. Peer review was perceived, without exception, as absolutely vital:

> If there is no peer review system, I suspect that there will be a lot more knowledge coming out, and it may not be worth my time to actually read it. And I think the peer review system, at least, limits the amount of stuff coming out, and weeds out stuff that's pure garbage. And I think that's very important. I think there has to be some accepted norm for that.

Peer review provides a hallmark of approval to scholarly work because if a piece appears in a very well-cited journal, one could take it with some value even if new to a field. Consequently, one frequent concern and misconception voiced by faculty was that electronic-only publications are not rigorously (or not at all) peer-reviewed, and thus do not have the same value as refereed work appearing in more conventional formats:

> There are some web-based journals that are emerging, but they're not of any significance...these are not regarded as peer-reviewed forms of communication. They're of lesser quality. And, as a result, nobody uses them.

> I'm not very convinced, although I'm willing to be convinced, that these newer forms have the rigorous review, peer review, that I think is important to maintain high standards.

The great importance of peer review was offset by the fact that the process of peer review is an extremely time-consuming process.

Deterioration versus improvement in the peer review process

Responses varied regarding the deterioration versus improvement of the peer review process. Although one faculty member detected deterioration in the last ten years, other interviewees did not identify a change. One faculty member believed that peer review has deteriorated because there has been increasing pressure to publish more. Coinciding with that has been a proliferation of journals, which ultimately requires more reviewers. Despite this, interviewees perceived good peer review as "a matter of knowledge and time," and although some academics may be flippant in the way they do peer review, the majority are articulate and of great assistance to the author.

C4.4 The reward system and publishing practices: advice

Faculty suggested most consistently that it would be essential to maintain peer review regardless of publication outlet. Interviewees stated, however, that they were unsure whether the reward system should be changed, and this was further supported by one administrator who argued that a high degree of objectivity is maintained under the current system.

One administrator suggested three changes: first, move the publication process back into the academy, thus removing a significant degree of the profit motive among publishers; second, create a system whereby peer review comments of submitted work are accessible to review committees; and finally, make use of professional societies if they are able to publish without financial profit. Finally, another administrator reported that academics can affect journal business practices when making choices about where to publish.

C5. An editor's perspective

Four of the faculty interviewed were editors of journals or served on an editorial board for traditional journals. One administrator stated that his/her duty is either to find someone qualified to do the reviewing or do the reviewing him/herself. S/he reported that all editors like to see their work, or other people's work, published in their journal, and that was motivation in itself. Moreover, faculty liked to see their work published alongside other high quality work and so opted for the prestigious journals.

According to the editors we interviewed, online formats were perfectly compatible with peer review. Editors often must deal with poor or incomplete reviews from referees and this obstacle can jeopardize the peer review system. Thus, finding good reviewers is problematic since faculty are often over-burdened.

C6. The state of e-publishing in chemical engineering

C6.1 Current scholarly practices

In chemical engineering, the main form of publication is refereed journal articles and conference proceedings; the emphasis on one or the other varies by subdiscipline. The main form of electronic communication is online journals: all disciplinary journals are available online as well as in print, and one smaller one is only available online. Cybertools allow chemical engineers to research and analyze chemical processes in new ways, and help facilitate collaboration and communication among researchers.

C6.2 Emerging scholarly practices

Online research databases give chemical engineers unprecedented access to published research articles and to databases of chemical properties. High performance computing tools allow researchers to calculate and predict chemical properties, visualize and analyze complex multi-scale chemical processes through techniques such as computational fluid dynamics (CFD), and simulate virtual engineering systems. Collaborative and distributed research environments, as well as subject-specific portals and virtual conferences, help enhance communication among projects and scientists.

Article databases

Published research in chemical engineering is now easily accessible online, through a variety of subscription-based databases. Perhaps the best-known is the American Chemical Society's Chemistry Abstracts Service (CAS).[53] A database of chemistry-related articles from over 40,000 journals, CAS also indexes patents, conference proceedings, and a substance identification system (the CAS Registry).[54] Search tools such as SciFinder and STN permit queries by reaction, chemical structure, and advanced database commands.[55] For engineering articles and data, researchers can turn to subscription-based interfaces such as Knovel and Engineering Village 2.[56]

A few article databases are open access, such as the National Institutes of Health's PubChem and the National Center for Biotechnology Information (NCBI). The latter includes data archives, open-source software tools for data mining and visualization, and educational resources.[57] The Department of Energy has an open access e-Print Network that indexes science and engineering "e-prints" (such as preprints, reprints, technical reports, and conference publications) across more than 19,650 institutional repositories and sites in the Deep Web, including sites nominated by patrons.[58]

Finally, CrossRef is a citation service used by most chemical engineering journals to link articles across different servers and publishers.[59] With CrossRef, readers can move from one article to another at the citation level, and any publisher can register their content for a fee.

Chemical Property Databases

Chemical engineers can also use a different set of databases to access experimental data about chemicals and fluids, such as their thermodynamic, transport, and physical properties. Examples are OLI Systems' Databank and the AIChE-sponsored DIPPR (Database of Evaluated Process Design Data), both available by subscription.[60] Computer-enabled Laboratory Information Management System (LIMS) tools such as STARLIMS then allow researchers to manage, re-use, and share large quantities of experimental data, as well as track laboratory workflow and regulatory compliance.[61]

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[53] http://www.cas.org
[54] http://www.cas.org/EO/regsys.html
[55] http://www.cas.org/SCIFINDER, http://www.cas.org/stn.html. eScience is a CAS tool that also searches other article/news sources like Google and the *New York Times*, http://www.escience.org
[56] http://www.knovel.com, http://www.engineeringvillage2.org Other common article databases are CambridgeSoft's ChemFinder.Com and Thomson's Web of Science and Web of Knowledge, http://scientific.thomson.com/products/wos, http://scientific.thomson.com/webofknowledge.
[57] http://www.ncbi.nlm.nih.gov
[58] http://www.osti.gov/eprints
[59] http://www.crossref.org
[60] http://www.olisystems.com, http://dippr.byu.edu
[61] http://www.starlims.com

Modeling, Simulation, and Computational Analysis

Computer tools allow chemical engineers to do more with chemical data than would be possible in a traditional lab: they can run complex numerical computations, model and predict chemical processes, and design virtual engineering systems.[62] Some tools use numerical methods from statistics and quantum mechanics to calculate the properties of multi-scale systems and to predict behavior and reactivity under a variety of simulated conditions, examples are Carnegie Mellon's open access software ASCEND and commercial packages such as Gaussian and Accelrys' Materials Studio.[63] Other tools simulate and visualize dynamic processes such as fluid flows, examples are Fluent's commercial software for computational fluid dynamics (CFD) and Reaction Design's CHEMKIN.[64] Finally, with OLI System's DynaChem, engineers can design and visualize virtual chemical systems in industrial plants and in the natural environment.[65]

Community

Thanks to online collaborative and distributed research environments, chemical engineers in different locations can work together. The Department of Energy's National Collaboratories provide a collaborative infrastructure, for example for the Collaboratory for Multiscale Chemical Science's research on combustion.[66] The TeraGrid, initiated by the NSF and run at several supercomputing centers nationwide, is a comprehensive distributed computing infrastructure for open scientific research.[67] Selected research projects gain access to over 100 TeraFlops of computing resources as well as analytic and visualization tools, and infrastructure for sharing and storing data.

The American Institute of Chemical Engineers (AIChE) hosts several online technological communities, such as the Center for Chemical Process Safety, which is building a forum and other interactive tools to disseminate process safety knowledge.[68] Another AIChE community, the Institute for Sustainability, uses their site to host computer-enabled virtual meetings.[69] The online site of *Chemical Processing Magazine* offers a subscription-based hub for the field, including articles, product reviews, careers, newsletters, and discussions.[70]

C6.3 E-publishing venues

Online Journals

It has become standard for journals in chemical engineering, such as Elsevier's *Chemical Engineering Science* and the *AIChE Journal,* to be available online, though they maintain a traditional print-like format.[71] The American Chemical Society has put all their journals online retroactively as well.

[62] AIChE's Computational and Molecular Science and Engineering Forum (CoMSEF) lists a variety of cyber-enhanced research projects that indicate the real scope of this category: http://www.ecs.umass.edu/che/am3/AIChEacad.htm
[63] http://ascend.cheme.cmu.edu, http://www.gaussian.com, http://www.accelrys.com
[64] http://www.fluent.com, http://www.reactiondesign.com
[65] http://www.olisystems.com
[66] http://cmcs.org, http://www.doecollaboratory.org. Another example is the Collaborative Large-Scale Engineering Analysis Network for Environmental Research (CLEANER), http://cleaner.nacse.org
[67] http://www.teragrid.org
[68] http://www.aiche.org/CCPS/ActiveProjects/Current/181.aspx
[69] http://www.aiche.org/IFS/Products/Virtual.aspx
[70] http://www.chemicalprocessing.com
[71] www.elsevier.com/locate/ces, http://www.aiche.org/Publications/AIChEJournal.

Several societies and companies offer hosting and journal management services to support online journals. In 1998, the American Chemical Society partnered with ARL's SPARC (Scholarly Publishing and Academic Resources Coalition) to add some innovative digitally-native features to their journals, such as *Industrial and Engineering Chemistry*.[72] For example, authors can submit and track their articles through Paragon Plus, an online submissions environment.[73] Online sites for ACS journals are also able to host supplemental information for an article, such as datasets, software, and other files not traditionally included in print format.

The American Institute of Physics (AIP), which publishes some titles relevant to chemical engineers, for example the *Journal of Rheology*, offers a suite of web-based tools for online submission, peer review, and editorial management.[74] Authors can deposit material supplemental to their journal articles, such as simulations and data files, in the AIP's Electronic Physics Auxiliary Publication Service (EPAPS).[75] ScholarOne is a commercial provider of online journal management infrastructure for STM journals; they are used, for example, by the *Journal of Fluid Mechanics*.[76]

The Berkeley Electronic Press (bepress) publishes the only online-only journal in chemical engineering, *The International Journal of Chemical Reactor Engineering*.[77] They have pioneered a "quasi-open access" policy: individuals can freely access any article by filling out a guest access form that bepress uses to notify their institutional library of their interest; once the institution subscribes, there are no more forms to fill out.[78]

When it comes to open access, ACS journals now allow authors to freely reprint their articles one year after publication.[79] Moreover, articles that include NIH-funded research become available one year after publication on the open access article database PubMed Central. In 2004, Elsevier announced that their authors can now post the final text of their article on a personal or institutional website.[80]

Electronic Books and Conference Proceedings

Major scientific publisher Taylor and Francis has an eBookstore that includes 69 titles in chemical engineering.[81] Users can subscribe and read content online, download books offline, print books or selections on demand, and compile selections from different books into a custom-made reference compilation. McGraw-Hill's Digital Engineering Library makes about 400 book chapters in chemical engineering available online, by subscription or paying by article.[82] On the open access side, the National Academies Press offers free PDF downloads of many of its titles.[83] Finally, a partnership between

[72] http://pubs.acs.org/journals/iecred
[73] http://pubs.acs.org/paragonplus
[74]http://journals.aip.org, http://scitation.aip.org. Scitation is one publisher that uses the CrossRef platform described earlier. The Society of Rheology, for example, uses Peer X-Press to manage their *Journal of Rheology*, http://scitation.aip.org/joro. Scitation also publishes its own "Virtual Journals," topic-specific edited compilations of articles published elsewhere that can be purchased on demand, http://www.virtualjournals.org
[75] http://www.aip.org/pubservs/epaps.html
[76] http://www.scholarone.com, http://jfm-www.damtp.cam.ac.uk
[77] http://www.bepress.com/ijcre
[78] http://www.bepress.com/quasi_openaccess.html
[79] http://pubs.acs.org/reprints/policy.html
[80] http://www.sciencedirect.com, http://www.elsevier.com/wps/find/authored_newsitem.cws_home/companynews05_00145
[81] http://www.ebookstore.tandf.co.uk
[82] http://www.digitalengineeringlibrary.com
[83] http://www.nap.edu

Engineering Conferences International and the Berkeley Electronic Press has resulted in a handful of conference proceedings published online.[84]

C6.4 Institutional support

Much of the support for cyber-enabled chemistry comes from government science institutions. The NSF has a funding line called "Engineering Sciences for Modeling and Simulation-Based Life-Cycle Engineering and Manufacturing" for projects that use computational techniques.[85] The Department of Defense's High Performance Computing Modernization Office (HPCMOD) supports the development of high performance computing infrastructure for the science and engineering community.[86] Part of the Department of Energy's Office of Science, SciDAC is a research lab developing new tools and techniques for computational modeling and simulation.[87]

The private sector has launched its own initiative, the Chemical Industry Vision 2020 Technology Partnership, to develop new technology alongside national laboratories and academic researchers: target fields include computational fluid dynamics and computational methods for physical and chemical properties.[88]

On the international level, the International Council for Science and other partners have launched a Committee on Data for Science and Technology (CODATA) to promote open access use and re-use of scientific data.[89] Meanwhile, the U.K. has a National e-Science Center devoted to developing cyberinfrastructure for the sciences and engineering,[90] and a Centre for Process Systems Engineering, a research lab developing new computing tools for simulating multi-scale industrial and physical systems.[91]

Finally, AIChE supports cyber-enabled chemical engineering through its division of Computing and Systems Technology (CAST) and its Computational Molecular Science and Engineering Forum (CoMSEF).[92]

[84] http://services.bepress.com/eci
[85] http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13621&org=CTS
[86] http://www.hpcmo.hpc.mil
[87] http://www.scidac.org. There are smaller research labs affiliated with particular universities, such as the Center for Computational Chemistry at the University of Georgia, http://www.ccc.uga.edu
[88] http://www.chemicalvision2020.org
[89] http://www.codata.org
[90] http://www.nesc.ac.uk
[91] http://www.ps.ic.ac.uk
[92] http://www.castdiv.org, http://www.ecs.umass.edu/che/am3/AIChE.html

CASE STUDY: ANTHROPOLOGY

A1. Introduction

A1.1 Background

Anthropology is a diverse discipline encompassing four distinct subdisciplines (socio-cultural, linguistic, biological, and archaeology) and with strong links to related disciplines (e.g., genetics, political science, classics, paleontology, ecology, economics, sociology, etc., depending on the subspecialty). The breadth of the discipline and diverse strategies for publication among its practitioners make it a particularly interesting case; for example, some biological anthropologists are more likely to publish in journals, some sociocultural anthropologists to publish in monographs and books. In some subfields, research is heavily dependent upon a variety of media. For example, video, audio, geospatial, and multilingual data are common formats. The primary scholarly society in the field, the American Anthropological Association, is undertaking an ambitious project to create an interactive repository of publications and research tools. AnthroSource, funded by the A.W. Mellon Foundation, is being published in association with UC Press.

A1.2 Profile of interviewees

The interview data are drawn from seven interviews (conducted between July 2005-February 2006) with three faculty members, three administrators, and a librarian. Two of the interviewees were also editors. The interviewees represented biological anthropology, linguistic anthropology, sociocultural anthropology, and archaeology.

A2. Publishing models; the needs of the discipline and how the publishing model fits these

A2.1 Perceptions of traditional and non-traditional forms of communication and publication

Perceptions of traditional forms of communication and publication

Standard forms of scholarly publication in anthropology comprise peer-reviewed (refereed) journals, scholarly books (both single-author and collected volumes), and monographs, although faculty repeatedly pointed out that the importance of any single type of publication varies depending on the subspecialty. For instance, it was noted that social anthropologists and archeologists may produce films while textbooks are not an unusual publication format for some archaeologists and biological anthropologists. Although textbooks may contribute to the success of a scholar, writing them is perceived as time consuming, cutting into research activities, and may ultimately reflect negatively on one's career. Presenting papers and publishing in proceedings at conferences is also very important, as is becoming well-known and connected within one's subspecialty and the field overall.

Perceptions of non-traditional forms of communication and publication

The faculty we interviewed were aware of some newer forms of communication and publication, particularly online publication, which was mentioned by all interviewees. Newer forms of publishing are not, however, widely adopted, and remain on the fringe. One interviewee pointed out that online-only journals have had a difficult start in anthropology; one American journal has "gone under" and two

British journals "haven't been terribly popular." This failure to thrive among online publications may be due to the newness factor in part, as one interviewee pointed out:

> It's like a new journal. People are afraid to submit to a new journal because they're not sure that it's going to be taken very seriously, number one, and number two, the people who want to start a new journal are going to be slightly less selective if they're having trouble getting people to publish in it. And so there's always this aura of, it's not quite up to snuff, in a new project. And that's the way these [online publications] are, these are new, and I think the newness is part of that process.

One faculty member noted out that e-journals are often not perceived as legitimate forms of publication because there is a fear that such publications are not rigorously peer-reviewed, if at all. One senior faculty member stated that although newer publication outlets constitute a useful source, s/he has not yet published online because of an abundance of publication requests in conventional formats. Incidental online publishing often occurs, for instance, when faculty contribute to conference proceedings or participate in interviews that are made available online. One interviewee, however, reported that s/he often circulates work to colleagues electronically prior to publication, in order to get private feedback, and that this is common practice. Interviewees uniformly reported that they are not aware of senior academics in the field using newer outlets of communication and publication.

Despite the hesitance expressed about online-only publications, many aspects of online communication and publishing appealed to several of the interviewees:

> The newer ways of doing it are the kinds that I'm really interested in… I like the dynamism of the digital publication. So, for instance, publishing a paper as a PDF, and then distributing it through a website to me is a really interesting way of doing it.

One interviewee appreciated the 'two-way nature' of new media and was interested in pursuing more social software. Overall, however, there were differing levels of knowledge about available online tools for communication, such as blogs, wikis, and other social software.

Basic technologies such as email were reported as used extensively, both by faculty and administrators, although several interviewees pointed out some difficulties, such as the accumulation of large numbers of email messages.

A2.2 Publishers, publishing models and accessing new publications

Publishers

Faculty opinions about publishers varied widely, owing to the diverse subfields represented, each with different standard publishing outlets. Therefore, responses regarding identification of prestigious and reputable publishers are predictably heterogeneous. For biological and linguistic anthropology, prestigious journals were listed, including *Nature* and *Science* as well as niche journals, whereas socio-cultural anthropologists were more likely to publish books, and archaeologists reported making use of both types of publication. One administrator whose scholarly specialty was outside of anthropology identified university presses as key publishers (including Cambridge, Princeton, Chicago, and perhaps Cornell).

Faculty were of the opinion that scholarly societies appear to play a major role within the field overall (though this was not true of all subfields) as societies tend to publish the journals with the highest impact ratings. The prestige of society journals is based on, as one faculty member explained, "a very heavy

rejection rate. All you need is percentages, although it's nice if the numbers are also big, and the quality of the editorial board is high."

Publishing models

Open access. Without exception, interviewees agreed that the open access model of publishing seems to be a good idea. At least one faculty member felt as though open knowledge might help close the gap on what s/he felt was an "anti-intellectual phase" in the U.S., a distrust of the intellectual world. More specifically, one individual believed that open access models represent an ideological issue in which knowledge should be accessible to everyone, partly to avoid breeding distrust. One faculty member pointed out that archaeologists already use some open access websites to share field observations.

One repeated concern was the copyright issue:

> You put a hell of a lot of work into scholarly production. I mean, it's your work, it's your work. And a piece of work…that is worth the effort is hundreds and hundreds and hundreds of hours of labor. And I don't feel awkward saying I want copyright. I'll give people access to it, but…I'm not just aerosol spraying it into the universe, into the wind.
>
> If it is so accessible, then how do you control people taking your stuff if you don't get a copyright? That's a big concern. So that would be a big concern, even for me.

Faculty more familiar with open access models suggested that academics should license their work through Creative Commons or Science Commons which allows the customization of access to scholarly material. Another concern was quality control in terms of who could submit work and whether or not inclusions would be peer reviewed.

Most faculty were curious about how such a venture would be financed and were unsure about the effect open access might have on publishing in general. One interviewee admitted that although data can be made available, it does not necessarily mean that other academics will be drawn to use them or will be able to make sense of them, so there ought to be more than simple repositories, especially since there is often already a glut of information available.

Author-pays. Faculty opinions about the author-pays publishing model were generally negative. Three interviewees discussed the inequalities it could create, including the burden it would place on younger faculty, students, and international colleagues who may have fewer resources and, arguably, the most need for high-profile publications. One interviewee objected on the philosophical grounds that no one should have to pay for knowledge and, as such, it should not be treated as a product. Another faculty member felt that paying to publish is akin to advertising (indeed, such journals often print a rider to that effect) and is precariously similar to the commercialization of science:

> You're advertising your work, you're putting money forward to get it publicly presented. And it's not always said that way, but basically that's what it amounts to. And that also decreases the value that others have taken from it. It's like someone wanting me to write a recommendation but saying I want to read it first. Well… I'm not going to write it the same way.

Accessing new publications

Although two faculty members reported accessing new publications electronically, two interviewees stated that they prefer hard copies (despite one of those accessing new publications online):

> I, personally, am somewhat anachronistic in that regard. I subscribe to hard copies, and if I need something else, I go to the library. I don't typically go through the Web.

The rationale underpinning the preference for hard copies was twofold: firstly, reading on screen is hard on the eyes and, secondly, it is easy to flick through printed pages of a book or journal and keep abreast of the field. One administrator mentioned that while accessing particular articles is fine either in hard copy or online (because online articles can be printed and read in hard copy), s/he has an assistant who retrieves such information so that articles always arrive to him/her in hard copy. Two interviewees also mentioned the pleasure of occasionally browsing through books in the library or bookstore.

A2.3 Data storage and preservation

Types of data produced

Anthropology faculty produce a wide variety of data ranging from text to quantitative data to still and motion video or animation. Archaeologists produce large amounts of both handwritten and, more recently, electronically generated field notes, drawings, photographs, and sometimes video records of excavations, as well as substantial analyses (such as measurements, counts, and weights on everything from animal bones and plant materials to clay figurines). In certain subfields of biological anthropology, data tend to be more quantitative, or "bench laboratory science," according to two faculty. Additionally, as one interviewee explained, a large fraction of published material is not based on primary data, but as essays and theoretical interpretation. One administrator added that the data produced in the social sciences, in general, are very heterogeneous, including everything from data-free formal modeling to quantitative datasets to qualitative case study data.

Data storage and preservation arrangements

Data storage and building of databases were big issues for the faculty and administrators interviewed. This is especially true in archaeology, where there are large teams of people working at excavations, including specialists in flora, fauna, osteology, and other topics, such as database specialists. According to one faculty member, archaeologists usually do not trust outside specialists with their data (e.g., computer scientists or photographers) because of its fragile and temporal nature.[93] As a result, archeologists are "renaissance people" and do much of the archiving work themselves, and they train their students to be savvy technically. In biological anthropology, however, data are more quantitative, and faculty perceived these to be manageable and homogeneous, and stored on servers or floppy media.

Interviewees posited that non-traditional data storage formats lend themselves well to archaeology in particular. Specifically, online databases are useful for preservation of a site's data (in the form of notes, photographs, and videos) because the very process of excavation destroys the site. For instance, in England, the data from any government-funded excavation must be shared with the public and this is starting to be the case in the U.S. as well. One faculty member mentioned at least two large, centrally

[93] We're actually very, very destructive, because you can't get down below what you're doing unless you destroy it, and you can't know what it is… you can't know the context of what it is unless you dig it, and when you dig it, you destroy it. So that means that we are very, very dependent on observations, and observations that we can write down, or there are other ways of recording observations.

organized online databases for such material: one is through the Museum of London and the other is open access. In addition, the value of online sources was mentioned in relation to teaching by another faculty member, where students can study materials before class and then come readily prepared for discussion.

One pressing issue for faculty is the problem of storage media becoming obsolete. This is compounded by the fact that faculty are responsible for preserving their own data and receive no campus support. One faculty member stated that s/he has personally migrated older data in order to ensure its usability. Another interviewee highlighted the challenges:

> The real challenge is that the technology changes. The storage medium changes. My Ph.D. thesis was written on two different kinds of disks… I have to go to very, very specialized technical places these days to even read that stuff. And most of the disks have deteriorated, and so I actually don't have, any longer, direct access to my own written work, except by paper… Now, I think that what's going to happen is that we're going to continually change our storage media, and with that, each change requires that you move things forward. If you don't have time, you don't have the equipment, or you've waited too long and the equipment has sort of become obsolete, it's very, very hard, and that means that there's going to be a very selective moving forward of work. I certainly find that true with my own stuff.

Data storage and preservation guidelines

For the most part, faculty in anthropology reported that funders do not encourage the storage or preservation of data in any particular way. One faculty member with a focus in biology stated that s/he has only been encouraged to store data in a particular way when the data were relevant to clinical trials. Under these circumstances, data are carefully recorded in lab notebooks and countersigned. For example, in biotechnology-related fields, mixing investigational medications would be recorded by hand, signed by the lab supervisor, and stored for a number of years to ensure proof of concept.

Some biological anthropologists may be less concerned with long-term data storage because raw data are not as precious as overall published research findings. Similarly, publishers are usually less interested in the actual excavation materials than in the archaeologist's interpretations. According to another faculty member, primary research articles tend to fade into the background of scholarly memory after ten years or so; it is books and longer essays, reflecting on the meaning of the research, that are passed on to new generations.

A3. Driving forces behind why faculty publish where they do

A3.1 Advantages and disadvantages associated with newer forms of communication and publication

Perceptions of advantages associated with newer forms of communication and publication

The anthropologists interviewed identified a number of advantages associated with newer forms of communication and publication. Interviewees repeatedly mentioned the speedy publication of a large volume of materials in a matter of months as a vast improvement. It was noted that the same publication would take years to publish in conventional formats. In addition, faculty viewed newer forms of communication as significantly engendering opportunities for dissemination of knowledge, scientific discussion, and feedback, while increasing international collaborations. Other advantages include: less time and money needed to produce and move paper around, ease of finding and quoting sources, greater capabilities in terms of the inclusion of animation/simulations in scholarly articles, and the ability to link textbook material to such online enhancements.

Only one interviewee reported that new media had little effect and that was most likely because it is a recent phenomenon relative to his/her career, most of which has been based on traditional publication in journals and books.

Perceptions of disadvantages associated with newer forms of communication and publication

In addition to copyright issues already mentioned, the very nature of the scholarly process changes with the use of some newer technologies, as one junior faculty explained:

> It's making everything accessible and transparent, and not secretive to some degree...and things that you're saying are things that are immortal, then…because they're out there and they're going to be there for all time… So you're committing things to paper. It's very different than you just saying them, for example, at a public meeting or at a conference.

Another faculty member perceived a shift in the entire learning process, although this is not necessarily a disadvantage. Most notably, the use of media beyond text, such as visual representations, has the advantage perhaps to draw in a more diverse audience.

Another faculty member expressed concern that there is a glut of information available, not all of it of the highest academic quality, though s/he did not perceive that as a major obstacle.

> Well, I think there is something to be said for revisions and review processes, you know, [it] tightens up scholarship. I think there's a lot more junk out there…things that aren't thought through as much as they could be or should be. But somehow...it may be all right, because a lot of them are not in media that are really costly…you just delete it, go to another website or something like that... So I think that things…can be done a little bit more hastily, although there certainly are some fantastic things.

A3.2 Factors influencing choice of publication venue

Making a name for oneself both nationally and internationally

In anthropology, faculty and administrators repeatedly mentioned the need to publish in high-impact books or journals, depending on one's subspecialty. According to one junior faculty member, such considerations result in most junior faculty choosing high-impact journals in which to publish, regardless of other considerations such as the length of time until publication or regard for the journal/editor. On a more general level, several interviewees noted that originality and "outside the box" thinking can make a career. As one faculty member aptly stated, "it's still the newness that drives notoriety, for the most part." For socio-cultural anthropologists, the writing matters most, especially one's ability to "capture people's imagination."

Self-promotion via conference attendance was also mentioned as helpful but not necessary for building a reputation, and developing personal relationships enhances a scholar's long-term success and promotion:

> Well, you can do certain things electronically, but you've just got to show up [to conferences or to give papers] and look at people in the eyes.

> You give a paper, they like you, you spend some time with them, you don't have two heads. They want to talk to you again, you know, you invite them, they invite you, and suddenly you've got a vector. And that vector is convertible, through letters, into capital. …one is always in a sense growing relationships, and it's very important.

The requirements for advancement with regard to publication

Interviewees suggested that anthropology is primarily a "book discipline," meaning that faculty must write books, at least one "great" book for tenure, and another book to be promoted to full professor, or as one administrator put it:

> Anthro is just sort of irreconcilably book fetish-ized… This is a book discipline. You can have great articles, you hit a ceiling, potentially very low, if you don't have a book, and the book has to be significant, it has to get reviewed in the right places…

Administrators pointed out that books should be published by prestigious university presses and that this is usually not a problem for UC Berkeley faculty. As one administrator noted:

> There's no dearth of university presses willing to publish really good work… The good work gets published, and we want the good work being done at Berkeley to be published, and we don't really worry that it's not going to be.

Interviewees reported that faculty seeking tenure often choose university presses because there is confidence that the book is meant for scholars and has high scholarly standards. Interviewees mentioned other requirements for tenure and promotion including: conference attendance, publishing journal articles, contributing chapters to and/or editing collected volumes, or writing a monograph. Subspecialties within anthropology may differ slightly. For instance, one interviewee stated that a consistent record of publication in peer-reviewed journals is the key to advancement in biological anthropology. Junior faculty are advised to always publish in high impact journals and most make the great majority of their decisions on where to publish based on this criterion. One administrator described the tenure process as a "treadmill" of sorts:

> So tenure? An important book and eight to 10 articles, of which a good subset should be peer-reviewed journals, and the rest should be in edited collections that can be described as important. To advance from associate professor to…full? Another book, another eight to 10 articles. From full to [step] six, another book. …There's six steps in assistant, five or six in associate, and nine in full, and after nine you go into hyperbole. You go into free agency.

But the advancement process is not necessarily so clear to junior faculty. As one administrator concluded:

> It is up to the chair of the department to make clear to new hires what the expectations are for getting tenure, because people don't come in and read a booklet that tells them that. So they have to be told. But, after all, if you start a career in academia at the assistant professor level, you would have to be unusually oblivious not to be asking the question: 'what do I have to do in order to get tenure here?'

Senior scholars, well-established in their field, who are trying to reach a broader audience may also consider publishing a book with a prestigious commercial press that will advertise well.

The advancement process and new publication methods: a support or hindrance?

In general, anthropology faculty reported that the current rewards system hinders the use of newer publication methods. As mentioned above, interviewees stated that there is the fear that articles in e-journals are not peer-reviewed and are therefore not authentic or legitimate.

> There's definitely the fear that articles that are in Internet journals, for example, are not peer-reviewed, although they are. I mean, *Internet Archeology* is peer-reviewed…so there is a fear, but yet it's…somehow it's still illegitimate. It's not a legitimate form of publication.

One administrator commented that there are so few advancement cases that mention online publication that the medium of publication is irrelevant as a criterion for consideration. The main issue is peer-reviewed versus non-peer-reviewed status.

One faculty member, however, commented that s/he perceives that "the current advancement approach lags significantly behind the information value of the electronic media."

The value of new forms of publication

Faculty interviewees did not view non-conventional forms of publication as holding the same value for tenure and promotion as more standard forms, therefore they do not use them; this is particularly true of senior faculty:

> I would say that people who have not been around the electronic media, especially the most senior people, who have not put as much energy into it, are even less savvy at understanding what's valuable and peer-reviewed and trustworthy and what's not. And as a result there's a lot of out-of-hand dismissals. So I think it'll be a while before it becomes a really important part [of academic advancement].

One administrator mentioned that this lack of use is true for all social science fields. One tenured faculty reported regularly publishing electronically, as well as having an interest in other online fora such as blogs and wikis. S/he stated that a few colleagues also see new forms of publication as having the same value as traditional ones, but other faculty much less so. Another faculty member mentioned that biological scientists tend to "do things the old-fashioned way" and are even less interested in new forms compared to other subfields of anthropology; s/he could think of only a few colleagues internationally who publish in e-journals. Interestingly, these two interviewees contrasted in their opinions. Whereas the former stated that in social anthropology, no faculty publish electronically, the latter speculated that social science faculty may be more inclined to such publication than biological anthropologists. Thus, it appears that use is uncommon and there may be perceptions among faculty that other subspecialties are using such forms more than their own.

One interviewee reported that online journals would not be seen as valuable until enough of them had been established, and particularly not until prestigious outlets such as *Nature* or *Science* made the move to online-only and open access. One administrator added that social science faculty and department chairs have not addressed the issue, partly because s/he believes that, at UC Berkeley, faculty have no difficulty publishing their work in first-rate publications. S/he speculated, however, that if a strict peer-review process were set up for various online outlets, departments would be more accepting of it.

Two senior faculty, one of whom was an administrator, felt as though the advancement process should accommodate non-traditional forms of publication for advancement:

> Well, I think it should…not just because I have colleagues who do it and so forth, but I think that that's the way in which things are going. I think there's a lot more interesting kinds of things one can do with some of these new kinds of publications in terms of the wider dissemination of ideas and research and so forth.

One faculty member pointed out that Ph.D. students at UC Berkeley are not allowed to submit dissertations in hypermedia format (only as .pdf files), unlike other universities. Interestingly, this scholar believed resistance to change came not only from administration:

> Other universities, you are able to have digital dissertations. I have a DVD of one from… University of Chicago, which is digital, and it's like a little hypermedia web. It's very interesting. It's got video embedded in it... Here we are at this big university and not taking any risks… It was the library, for the most part, who was resisting it.

A4. The evaluation of traditional and new forms of communication and publication

A4.1 Recent or current changes to the faculty reward systems

None of the faculty or the administrators interviewed had heard of any changes to faculty reward systems to accommodate newer forms of communication and publication. One former Budget Committee member thought that this topic was likely being discussed in the current Budget Committee, but was not aware of any formal changes to the system. Interestingly, the one faculty member who is an advocate of newer forms of communication and publication reported that every year faculty have to complete a bibliography (or biobib) of published works. S/he stated that electronic publications are "not taken as serious, legitimate publication to put in your personnel review," and gave as evidence the fact that the biobib form itself first has a space for books, then refereed journals, then reports, and "other" at the bottom, but "it doesn't say 'electronic,' it doesn't say it anywhere."

A4.2 The evaluation of new forms of communication and publication

When asked how newer forms of publication might be evaluated, both faculty and administrators expected a replication or variation of the current peer review process:

> They still have to be peer-reviewed publications, so they have to be going through some peer-reviewed way. And I think that then, after that, they would be looked at and weighed out and reviewed exactly the same way as any other kind of journal. As long as the submission process and the publication process is the same, that should be fine.

One interviewee pointed out that such review "might be necessary to do…on an almost discipline-by-discipline basis, and definitely division-by-division, and even subdivision."

In addition, one faculty member emphasized the role of the citation index stating how often and where a scholarly work has been cited, and s/he reported that electronic formats lend themselves to the tracking of citations more than their conventional counterparts. This could be problematic for works in collected volumes that are more difficult to track.

A4.3 The process of peer review: deterioration versus improvement

One interviewee perceived that the peer review process has changed in the last ten years in that there are more publications, especially "boutique" journals more specific to individual areas of interest. S/he considered this as an improvement, because it widens the range of interesting people on the editorial boards of many journals rather than just the top four, though s/he realized that others might not see this as an improvement. In fact, another faculty member commented that "there's just too much stuff. And if too much stuff is getting written then too much stuff is going to have to be read."

Another faculty member mentioned that the journal review process has improved because the pool of reviewers has expanded and become more international. In effect this has resulted in widely distributing key academics across editorial boards. This variability in reviewers has probably been the smallest for the top journals, like *Science* and *Nature*, but has been much larger for other less prestigious journals. Despite newer forms of communication like email, one faculty member mentioned that the time commitment and extensive time required to complete reviews has not improved. Several faculty and administrators could not comment about either improvement or deterioration.

A4.4 The reward system and publishing practices: advice

Faculty suggested that changes would have to be made at several levels, by individuals, departments, institutions, and among publishers. One interviewee thought that faculty should be educated about sharing work electronically while retaining copyright. This might alleviate many fears and hesitations. Such shifts in scholarly communication practices are likely to result in increased collaborations and joint publications. Another interviewee stated that societies and associations must first move to newer forms of publication thus encouraging academics to publish this way. Such a move would work to drive change at the institutional level in the reward system: "first we've got to do it, then we've got to fight for things to change at the higher level."

One senior faculty mentioned that departments should encourage faculty members who are electronically savvy enough to evaluate newer outlets of communication and publication in the review process. In the absence of such a person, cases that are electronically represented could be disadvantaged compared to their conventional counterparts. In addition, age plays an important role:

> As we move along, we're going to be more and more disadvantaged at looking at cases that are electronically represented. Because there are so many people who are not savvy…that creates this kind of dissonance between, oftentimes, the younger and older faculty. Younger faculty who want to be involved in this, and in fact are heavily involved oftentimes in electronic products and so on. That stuff is just almost invisible. And you can't take everything that's electronic and put it into paper, either, because a lot of the electronic stuff is fragmentary. I think that one of the things that is really critical in a person's career is the network that they're a part of, that is, who is it that listens to them and who is it that they're talking to. That's represented well these days electronically. And a lot of very significant communication goes on electronically, before it gets published. We have no way of weighing that kind of electronic network in this picture.

More generically, one faculty recommended a move away from the push for quantity and a greater emphasis on quality: "I would like to imagine a scholarly world in which we wrote a little less and it was a little better, and a little more original, and a little less, so that there was less pressure." S/he believes that time is critical to the scholarly process because faculty need "time to, you know, to poodle, just to run in and out of the bushes and see what you find. It's so important for a sustainable, long-term, creative scholarly work."

A5. <u>An editor's perspective</u>

Three of the faculty we interviewed were also editors. Two of the editors were on the editorial boards for peer-reviewed books and journals, although one faculty was the editor of an invitational journal.

Time was the most pressing concern for editors, both their own time and the increasing demand placed upon faculty in general. Often that translated into delays in the review process:

> When you have a book that you think highly of, it's a maddeningly slow process at the major presses. You can wait a year to hear back from an editor if they'll take your book…and it can be

> such a long process, and ditto on journals… I think that's a function of there's too bloody much work out there. There should be less and it should be really demanding, and the review process should be assiduous and it should not exceed 90 days. It shouldn't go 180, 270 days, because somebody's just so busy, and they are. It's not an ill will. It's just, people are just swamped.

One editor was hopeful that journals could sustain a variety of ways of publishing, including both print and online versions. S/he admits that online publishing, however, can increase the efficiency of dissemination, particularly recent finds or new reports, but also standard articles.

One problem with online submission, as one editor pointed out, is increased transparency. For instance, reviewers' identities may be revealed though many scholars prefer to retain the anonymity of the review process. [94]

Another burden that editors face is a lack of consistency in the submission process because some reviewers use handwritten notes and some use electronic tracking systems. While some online communication has enabled more efficiency in the review process and reduced the need for resources (such as support staff), technological barriers such as the lack of sufficient internet access could also be problematic when dealing with international communities of reviewers.

A6. The state of e-publishing in anthropology

A6.1 Current scholarly practices

In anthropology, publishing a book and several journal articles is a standard tenure requirement, with some variation among subfields. For example, biological anthropology tends more heavily towards journal articles. Recently, some scholarly journals and books are available electronically. More common is the use of computer tools to create and publish digital data collections and analyze them statistically and geospatially. The field also uses computer visualization tools for modeling artifacts, sites, and complex social interactions.

A6.2 Emerging scholarly practices

Datasets

Anthropologists increasingly need to collect, link, analyze, and preserve diverse datasets from field studies, archeological digs, and quantitative data collections. They use computer tools for statistical data analysis—such as SPSS for cross-cultural analysis (Dow 2003)—and rely on innovations in "semantic data integration schemas" to allow mapping and analytic queries among multiple datasets (Kansa 2005, Schloen 2001, Kilbride 2005).[95]

The Data Documentation Initiative (DDI) is one XML-based standard used by Harvard and MIT's Virtual Data Center, an open-source infrastructure that archives, catalogs, disseminates, and analyzes diverse

[94] This concern was also recently reported in the *Chronicle of Higher Education.* See: http://chronicle.com/wiredcampus/article/1156/peer-reviewers-identities-exposed

[95] Several standards exist for interoperating anthropological and archaeological datasets. Some use relational database principles, while many are data tagging systems based on XML. Examples of the former are the Digital Archive Network for Anthropology and World Heritage (DANA-WH), http://www.dana-wh.net, and CIDOC, a standard developed by museums and cultural heritage institutions, http://www.willpowerinfo.myby.co.uk/cidoc/stand0.htm. Archaeology-specific statistical tools can be found at the Archaeological Computing Laboratory at the University of Sydney, http://www.acl.arts.usyd.edu.au.

quantitative data collections.[96] The European Commission uses DDI for the Madiera Project (Multilingual Access to Data Infrastructures of the European Research Area), a semantic taxonomy that integrates over twenty social science data archives.[97]

The Alexandria Archive Institute (AAI)'s ArchaeoML is a different XML-based standard created specifically for archaeological excavation data. Used with AAI's Open Context, an open access database program, it includes an innovative social tagging system that allows users to define and share their own data tag sets, as well as comment on and reuse others'.[98] Similarly, Virginia Tech's ETANA-DL offers a field tool for collecting and recording data during excavations (DigKit), and a repository and archive tool (DigBase).[99]

Spatial Analysis and Visualization Tools

Anthropologists use spatial analysis to map statistical data over space and time using geographic information systems (GIS); archaeologists use computer visualization tools to model artifacts and interactive virtual recreations of sites.

Several databases of geospatial information exist online, such as the Alexandria Digital Library at UCSB and UC Berkeley's Electronic Cultural Atlas Initiative (ECAI),[100] and an array of tools have been developed to analyze such data for anthropological research. Combining statistical methods with GIS tools such as ArcView and ARC/INFO, anthropologists can study connections between locations and social phenomena, such as geographic distributions of wealth.[101] Temporal visualization tools can, in turn, identify spatial changes over time, such as urban growth.[102]

Archaeologists in particular use 3D visualizations for interactive virtual models of artifacts and sites, such as the virtual walk-throughs of several Roman sites at UCLA's Cultural VR Lab.[103] Software ranges from commercial imaging packages such Arius 3D or Maya, to the open access visualization format X3D[104] and accompanying set of archaeology-specific tools developed at North Dakota State University's Archaeology Technology Laboratory (ATL).[105]

Visualization and modeling have also led to innovations in teaching anthropology. Columbia and the London School of Economics have collaborated on the Digital Anthropology Resources for Teaching

[96] http://thedata.org
[97] http://www.madiera.net
[98] http://www.alexandriaarchive.org, http://www.opencontext.org. A related project using ArchaeoML is the University of Chicago's Online Cultural Heritage Research Environment (OCHRE), http://ochre.lib.uchicago.edu
[99] http://feathers.dlib.vt.edu
[100] http://www.alexandria.ucsb.edu/adl, http://ecai.org.
[101] For example, the Center for Spatially Integrated Social Science (CSISS) at UCSB's Geography Department has a software suite to support the collection and statistical analysis of geospatial data, http://www.csiss.org
[102]Examples are Flow Mapper from the Center for Spatially Integrated Social Science (CSISS) at UCSB's Geography Department, and Time Map from the University of Sydney's Archaeological Computing Laboratory (ACL) http://www.csiss.org/clearinghouse/FlowMapper, http://www.timemap.net. TimeMap is specifically designed to work with the ECAI collection, which researchers can use to create and publish their own custom-made temporal maps.
[103] http://www.cvrlab.org
[104] http://www.web3d.org
[105] http://atl.ndsu.edu. Digital Archaeology is a for-profit company offering modeling and animation services to cultural heritage institutions, http://www.digital-archaeology.com

project (DART), using video and computer imaging to walk students through the process of anthropological interpretation.[106]

A6.3 New publishing venues

Online Journals

The American Anthropological Association now makes all twenty-six of its journals available online as well as in print. Of the nearly 100 online-only journals in anthropology, such as *Structures and Dynamics: eJournal of Anthropological and Related Sciences,*[107] a peer reviewed journal hosted at the University of California's eRepository, many are in non-English languages and in highly specialized subfields.[108]

Some anthropology subfields are represented in biosciences e-publishing. The *Journal of Ethnobiology and Ethnomedicine* is an open access, peer-reviewed, online journal published by BioMed Central, one of the leaders in open access science journal publishing.[109] Wiley Interscience, the large for-profit science publisher's online branch, hosts twelve e-journals of biological anthropology and a few e-books.[110]

The most often-cited online journal in archaeology is *Internet Archaeology*, maintained in the U.K. since 1996.[111] Fully refereed and subscription-based, it publishes multimedia excavation reports, datasets, visualizations, and computer tools as well as traditional articles. In the U.S., the Society for Historical Archaeology maintains its own electronic peer-reviewed publication, *Technical Briefs in Historical Archaeology*, that specializes in the fast dissemination of shorter technical papers.[112]

Book reviews also benefit from the fast turnaround of the online medium. Two examples are the University of Buffalo's Anthropology Review Database, which hosts its editors' own book reviews and gathers book reviews from other journals, and the *Bryn Mawr Classical Reviews* in archaeology and classics.[113]

Electronic Books

Some publishers have begun offering anthropology monographs online, such as dozens of Princeton University Press titles and hundreds of Taylor & Francis / Routledge titles.[114] Users can subscribe and read content online, download books offline, print books or selections on demand, and choose parts of different books for custom-made reference compilations. The California Digital Library's eScholarship Editions makes 300 UC Press books in anthropology available electronically; some open to the general

[106] http://www.lse.ac.uk/collections/anthropology/dart.htm, http://dart.columbia.edu. Similarly, North Dakota State's ATL creates interactive teaching environments using role-playing, for example, in its recreation of a Native American village, http://fishhook.cs.ndsu.nodak.edu. In the U.K., the University of Kent has a similar project entitled Experience Rich Anthropology, http://www.era.anthropology.ac.uk
[107] http://repositories.cdlib.org/imbs/socdyn/sdeas
[108] Estimate based on searches in the Directory of Open Access Journals, www.doaj.org, and the ARL Directory of Scholarly Electronic Journals, https://db.arl.org/dsej/FMPro
[109] http://www.ethnobiomed.com
[110] http://www3.interscience.wiley.com/cgi-bin/browsebycategory?code=LS20
[111] http://intarch.ac.uk
[112] http://www.sha.org/Publications/tech_briefs/technical_briefs.html
[113] http://wings.buffalo.edu/ARD/geninfo.shtml, http://ccat.sas.upenn.edu/bmcr
[114] http://www.ebookstore.tandf.co.uk

public.[115] Finally, the American Museum of Natural History offers its classic series of anthropology monographs, the *Anthropological Papers*, online for free download.[116]

In the U.K., the Archaeology Data Service of the Arts and Humanities Research Council has a project to incubate new e-publication formats that combine traditional scholarly monograph writing with electronic data archives and multimedia presentations.[117]

Resource Collections and Subject Portals

There are numerous portals and hubs for online anthropology resources. One of the most often cited is Anthro.Net, a user-reviewed portal to anthropology sites, data collections, and software tools.[118] Some portals focus on visual and video resources in particular, such as the National Anthropological Archives & Human Studies Film Archives.[119] For archaeologists, ArchNet is a portal edited by the Archaeological Research Institute at Arizona State University and part of the WWW Virtual Library.[120]

A major initiative by the University of California Press and the American Anthropological Association (AAA), AnthroSource is an electronic portal that aims, over the next years, to become the central online resource for anthropology.[121] It currently allows subscription-based access to AAA publications and their archives, fully indexed and searchable.

The Human Relations Area Files (HRAF) at Yale University publishes fee-based electronic resource collections for ethnography and for archaeology.[122] The collections include books, articles, and multimedia resources, and are indexed according to an in-house culture and subject classification system. HRAF occasionally publishes print reference works based on the collections.

Data Repositories

Data-heavy anthropological research can be published in data repositories such as the University of Michigan's Inter-University Consortium for Political and Social Research (ICPSR).[123] Contributions are evaluated by the editors, and the site offers multiple tools to search, analyze, and re-use contributed data.

Archaeology faces a particular challenge that data repositories can help address: preserving and sharing the full record of excavations. Excavations are inherently unrepeatable, but full publication of all the raw data and "gray literature" is limited by the constraints of traditional publication (Richards 2003, Kansa 2005).[124] "Gray literature" such as excavation data, notes, images, and working papers can now be published through a variety of electronic archives at a range of institutions. UNESCO's International Council on Monuments and Sites (ICOMOS) publishes electronic excavation reports, databases, white

[115] http://content.cdlib.org/escholarship
[116] http://digitallibrary.amnh.org/dspace/handle/2246/6
[117] http://ads.ahds.ac.uk/project/leap/
[118] http://www.anthro.net
[119] http://www.nmnh.si.edu/naa
[120] http://archnet.asu.edu. Another archaeology portal can be found at the U.K.'s Humbul gateway to the Arts and Humanities: http://www.humbul.ac.uk/archaeology
[121] http://www.anthrosource.net
[122] http://www.yale.edu/hraf
[123] http://www.icpsr.umich.edu
[124] http://intarch.ac.uk/journal/issue15/richards_index.html, http://www.gsajournals.org/gsaonline/?request=get-document&doi=10.1130%2FGES00013.1. The TAY project is an award-winning effort by the government of Turkey to record the cultural heritage of Turkey by publishing and presenting cultural heritage and excavation data electronically, http://www.tayproject.org.

papers, and other cultural heritage materials.[125] The Australian National University's PalaeoWorks group publishes databases and reports of Asian-Pacific palaeo- and archaeobotanical research.[126] In the U.K., the Museum of London's Archaeology Service publishes excavation reports online linked to relevant chapters from monographs.[127] Finally, the JISC-funded Archaeology Data Service (ADS), part of the Arts and Humanities Data Service (AHDS), is a major quality-controlled repository that, for a small fee, publishes contributors' fieldwork archives, digital artifact collections, e-books, journals, and reports (Killbride 2005).[128]

Community

Communication among anthropology scholars has been enhanced by digital tools such as fora, online conference sites, and blogs. Many disciplinary portals include event announcements, blogs, and discussion fora for scholars as well as the general public.[129] Anthropologists can also join Anthro-l, an email Listserv that also disseminates book reviews.[130] The Alexandria Archive Initiative (AAI) has developed AnthroCommons and ArchaeoCommons, website and interactive forum tools used at conferences such as 2004's American Anthropological Association.[131] These tools allow conference papers to be preserved and disseminated, a valuable "gray literature" often lost to traditional print publication (Lopiparo and Kansa 2006).[132]

In the blogosphere, Savage Minds is a collective anthropology blog written by academics in order to help scholars stay up to date with one another and to bring anthropology to a wider audience,[133] and Antropologi is a multilingual collection of anthropology news and blogs from around the world.[134]

A6.4 Institutional support

Several universities host research labs to develop tools for computer-enabled anthropology and archaeology. A frequently cited group is the Centre for Social Anthropology and Computing at the University of Kent, where one current project develops tools to simulate interactive ethnographic research.[135] The University of California Santa Barbara is a hub of geospatial studies; it is the home of both the Center for Spatially Integrated Social Science (CSISS) and the NSF-funded National Center for Geographic Information and Analysis.[136]

Numerous international institutions are devoted to preserving and sharing the world cultural heritage, including through digitization. EPOCH, for example, is a network of about one hundred European cultural institutions and commercial enterprises that support the use of information technology in cultural heritage projects.[137]

[125] http://www.international.icomos.org/centre_documentation
[126] http://palaeoworks.anu.edu.au/publications.html
[127] http://www.molas.org.uk/pages/productsWebpagesHome.asp
[128] http://ads.ahds.ac.uk
[129] http://www.anthrotech.com, http://www.visualanthropology.net
[130] http://danny.oz.au/communities/anthro-l
[131] http://www.culturalheritageinternational.org/anthrocommons, http://www.archaeocommons.org. The story of how AnthroCommons was used at the 2004 AAA, and participants' reaction, is told by Lathrop and Bakke (2005). http://www.aaanet.org/press/an/0905/Lathrop_Bakke.htm.
[132] www.alexandriaarchive.org/anthrocommons_eval.pdf
[133] http://savageminds.org
[134] http://www.antropologi.info/blog/anthropology/
[135] http://lucy.kent.ac.uk/csac
[136] www.ncgia.ucsb.edu
[137] http://www.epoch-net.org

When it comes to developing tools for digital archaeology, the University of Sydney and North Dakota State University both have prominent labs. For site visualization technology specifically, UCLA has the Cultural VR Lab, and Brown University has a Center for Digital Shape, Archaeology, Photogrammetry, Entropy (SHAPE).[138]

The NSF's Directorate for Social, Behavioral, and Economic Sciences has a funding line exclusively for Next Generation Cybertools devoted to the integration of qualitative and quantitative information in the social sciences and focused especially on developing incentives, standards and policies for collecting, storing, archiving, accessing, and publishing research results.[139]

[138] http://www.lems.brown.edu/vision/extra/SHAPE
[139] http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13553&org=BCS&from=home

CASE STUDY: BIOSTATISTICS

B1. Introduction

B1.1 Background

Biostatistics is a journal-oriented scientific field that mixes core research in the mathematical sciences with applied material that spans clinical medicine, public health, and the biological sciences. Recent publication concerns focus not only on publication lags and wide access to material, but also on the need to accommodate publication of original data (for example, in genomics) and software code to allow reproducibility of statistical analyses. Various innovative publication models are being developed independently in the field.

B1.2 Profile of interviewees

We conducted seven interviews with faculty members in this field (comprising regular faculty, former/current faculty administrators, and a former Budget Committee member). In addition, data are drawn from interviews conducted with a librarian.

B2. Publishing models; the needs of the discipline and how the publishing model fits these

B2.1 Perceptions of traditional and non-traditional forms of communication and publication

Perceptions of traditional forms of communication and publication

The primary conventional form of publication in biostatistics is the print journal although this varies by subdiscipline. For instance, while statistical journals are typically characterized by standard print publication, biology/computational biology journals utilize web publication. Other valued traditional publications include books and technical reports. With regard to conventional forms of communication, meetings are paramount, although meetings tend to be subspecialty specific resulting in the face-to-face communication of research findings with academics in the immediate field.

Perceptions of non-traditional forms of communication and publication

According to one interviewee, the last twenty years has seen an increase in the number of alternative commercial publications. For instance, pre-publications are now available providing online access to draft versions of articles prior to actual publication. Some faculty use their homepages to post preprint papers and technical reports. A couple of interviewees who work in software development explained that there is an emerging movement to publish software and software notes online. Inherent in this cutting edge publication outlet is the notion of reproducibility whereby manuscripts and code are both refereed. In addition, a couple of new electronic journals in biostatistics have been launched through bepress.

All interviewees had made use of newer forms of communication and publication in their careers, although to varying degrees. t one end of the spectrum, a faculty member published extensively in non-traditional publication venues with full backing and support from his/her department:

> The division of biostatistics here has been tremendously supportive of…non-standard publications. So I'm in a biased environment just because my colleagues are very innovative in that field… From very early on in my career, I've been pushed and encouraged, actually, to

> publish in non-traditional media, open source, or web-based publications… However, the profession, in general, is still not ready yet for these non-standard publication media.

Other faculty and administrators had published in alternative outlets to a lesser extent; for instance, technical reports appeared in an online format or print articles were also posted on a website. Furthermore, interviewees were aware of some senior academics in the field publishing in newer outlets, although felt that they are bound to whatever their journal of choice is doing in relation to publication.

B2.2 Publishers, publishing models and accessing new publications

Publishers

Publisher preferences are largely heterogeneous with an emphasis on the journal title rather than actual publisher. As such, one interviewee stated that s/he was unaware of the publisher. Most top flight journals are run by academic societies (such as the American Statistical Association and the Institute of Mathematical Statistics) or private foundations, although a number of commercial publishers were listed as prestigious and reputable (including Wiley, Kluwer, Springer, Blackwell and Elsevier). Medical journals were cited as "the best" due to their timely publication (for instance, the *Journal of the American Medical Association* and the *New England Journal of Medicine*). In such journals, editorial staff immediately read submitted papers and respond to the author. One faculty member explained that personal preference for particular journals is largely dependent on the nature of the articles.

The general perception held by interviewees is that scholarly societies hold the majority share of publications in biostatistics with the exception of medical, epidemiological, and health-related fields. It is acknowledged, however, that although some journals are sponsored by academic societies, they may be published by a for-profit publisher. Despite a number of faculty stating that their choice of publication venue is a function of scholarly society preference (rather than commercial publisher preference), one interviewee reported that other factors play into the decision:

> The faculty very much are influenced by the prestige of the journal, and that is determined by citation counts and the social science index, and…an impact index and all of that. That very much counts. The six journals I named in my subfield are the elite journals, and that's where you want to publish most of your work. So that's what they're really influenced by.

Publishing models

Open access. With the exception of one faculty member (who routinely publishes in newer outlets of communication and publication), interviewees required clarification about both open access and author-pays publishing models. Interviewees perceived open access positively in two ways. Firstly, since research is publicly funded, results would be accessible to a wide audience. Furthermore, open access is beneficial to poorer countries and institutions alike. Interviewees noted, however, that in order to be met with success, peer review must be retained in an open access publishing model.

Interviewees raised concerns about two negative aspects of open access; namely, there was the perception that the quality of expensive journals is excellent (in terms of checking/following up references, page numbering, etc.) and that this quality might be lost using a cheaper publishing model. In addition, the ability to download software was viewed as problematic because of security issues.

Author-pays. Faculty did not identify any positive aspects of an author-pays publishing model. They perceived that author-pays models might serve to discriminate against countries, institutions, and faculty with fewer financial resources. As one interviewee noted:

> I think, in general, author-pays is probably a pretty good idea but in practice you may need to have a few checks on that… You face the same problems as with the subscriptions... Not all journal subscribers are equal; not all authors are equal.

In addition, an author-pays charge was viewed as comparable to page charges or a tax. One interviewee suggested that biostatistics as a field does not have a sense of urgency regarding the dissemination of scholarly material which may make alternative publishing models somewhat redundant.

> Physicists and other fields (the biological sciences, genetics) are much more dynamic, they get immediate turnaround because the next guy wants to know what the previous guy did. They can't wait a year or two to see. It slows down his research on what he's doing. And it's more of an intertwined building thing, where ours are more like if you write a short story, you know, it goes out there and gets reviewed, and somebody reads it sooner or later.

In contrast, it is crucial in genomics or computational biology that research is accessible and rapidly disseminated.

Accessing new publications

New publications tend to be accessed primarily through campus online subscriptions (for example, JStor and PubMed), web searches, faculty websites, or through scholarly society membership. The latter provides access to online resources such as Project Euclid. One faculty member is on the mailing list for a number of journals and receives their tables of contents, despite the fact that s/he does not subscribe to these journals. Some interviewees are reliant on print versions of papers accessed online or subscribe to print publications. Moreover, interviewees indicated that they are more likely to glance at the table of contents in a print publication versus an online format.

Faculty and administrators had no idea how much the library subscription rates are, though they presumed that they are high cost. Responses ranged from "zero," the estimate of a faculty member who accessed articles mainly through PLoS, to "outlandish." Interviewees mentioned the consolidation of journals by Kluwer as problematic, and noted that in response, there has been an effort to launch competitive e-journals.

B2.3 Perceptions of data storage and preservation

Types of data produced

Because of the nature of the field, data produced in biostatistics are primarily quantitative although also include theory, text, images, audio, and software.

Data storage and preservation arrangements

Arrangements for data storage and preservation are varied and often depend on individual preference. Some faculty members take responsibility and back up data at home. A particularly vigilant interviewee not only ensures that his/her home computer is secure from hackers (it is not connected to a network), but has an off-site back up in another city. One interviewee relies on the department to back up his/her data

on a server, while another relies on his/her doctoral student to make arrangements for data storage and preservation.

Data storage and preservation guidelines

Generally, faculty felt that funders provide some guidelines for data storage and preservation. Some funders require the submission of a clean dataset post analyses and publication (i.e., the Robert Wood Johnson Foundation, whose datasets are then advertised as available, requested and signed for, as they do not appear in an open repository). Other funders encourage faculty to post data on their websites. One administrator, who serves on the board of the National Research Council, noted a compelling issue that not *all* data can be stored, which raises questions about data format and the features that will be retained in the long run. S/he identifies such questions as problematic given scholars are "projecting into the future." Despite the identification of the above guidelines by some interviewees, another interviewee suggested that funders do not encourage or provide guidelines, but rather "they look for the product at best."

B3. Driving forces behind why faculty publish where they do

B3.1 Advantages and disadvantages associated with newer forms of communication and publication

Perceptions of advantages associated with newer forms of communication and publication

Faculty agreed that using newer forms of publication and communication speeds up the publication process. Of particular benefit is the automated process that many e-journals favor:

> So if I know I work for a journal that's web-oriented, I will get automatic email reminders telling me I have so much time left to do my review. It's fine if I've lost the printed copy of the paper because I can just go to my web account and download the paper again. So it saves time and then also it saves errors as well. It prevents us from making errors, forgetting about due dates and so on and so forth. And there are records about the whole referee process.

Interviewees perceived the accessibility of scholarly material as a positive factor associated with newer forms of publication and communication, as well as the rapid dissemination of research findings (key for certain subfields in biostatistics). The ability to reproduce material was of particular importance and, with web-based journals, scholars then have access to data which allows such reproducibility:

> So it's viewing a publication, not so much just as text, but viewing a publication as text, data, maybe software, who knows what…It's a more global notion of a publication than just a few words on a page.

Perceptions of disadvantages associated with newer forms of communication and publication

Interviewees cited, correctly or not, the lack of peer review as a negative aspect of new publication outlets:

> The web is undisciplined. One needs to figure out what content is good/bad. The quality control of print journals is the same in a way, it's not that electronic journals fall victim to this. There are pluses and minuses to both. It screens out some trash and some gold and, as such, there is no guarantee.

Interviewees acknowledged that it will take time for newer forms of publication to gain the prestige and reputation associated with print publication and, consequently, publishing in one of the newer modes does involve a certain risk factor. Furthermore, some faculty are not computer savvy so they may find the

process somewhat daunting (e.g., online manuscript submission). Linked to this is the perception that there are various glitches associated with e-journals (i.e., what happens in the event a password is forgotten?). In addition, there is a concern about archiving of scholarly research. With electronic material, maintenance is questionable, unlike its hard copy counterpart. Newer publication forms are perceived as "quick and dirty" and, arguably, a paper published in these forms might not be in existence in twenty years as a classic paper.

B3.2 Factors influencing choice of publication venue

Making a name for oneself both nationally and internationally

Interviewees explained that establishing a national and international reputation is achieved through a combination of factors. Traditional print publication is fundamental, though this varies by subspecialty; conference attendance is equally important. The latter exposes a scholar to already established academics and helps to expose his/her work in the public arena. The impact an individual scholar has on the field is, therefore, paramount. An interviewee discusses the importance of the "old boy network:"

> You know people and they know you, and they know your work and you know their work, and you sort each other out in a weird way, and review their papers, and you review their promotions.

Despite the requirements for establishing a national and international reputation, biostatistics at UC Berkeley is innovative and progressive and, as such, these requirements do not appear to influence faculty members' publishing practices entirely. For instance, one interviewee's publishing record departs from standard practice in terms of the appearance of non-conventional publications.

Because senior academics tend to have tenure, the identified publishing requirements are often not as crucial for established scholars. As one faculty member explains:

> I used to be desperate when I was an assistant professor… I paid a lot of attention to…prestigious journals and I tried to get papers in *Nature* and some of these very well-known journals. And I gave that up soon after… Once you're tenured, then you make decisions according to what you think…[if]…they do a good job, or if they're communicating with an audience that I want to communicate with. So the decision then became much broader and more personal.

Senior academics are, therefore, in a position to support new publication venues although interviewees still perceived that it is not advisable for young faculty members to publish in such venues.

The requirements for advancement with regard to publication

Although it is difficult to quantify, faculty agreed that three to four peer reviewed articles per year is required to work one's way up the academic ladder. Peer reviewed scholarly work is viewed as essential at UC Berkeley and other top research universities:

> The whole academic reward system feeds into how you get grants and how you get prizes or recognition within your professional society. It all depends on peer review publication and the whole system is intricately designed and works very well. Peer review will have to remain a key component because it's been very successful—it is how scientists judge their science and it is the currency faculty cash in on.

Biostatistics appears supportive of alternative publication outlets and, as such, does not have specific publication requirements in terms of publishing outlets. One interviewee, who has used a number of

non-standard publication vehicles, felt that s/he has been judged on the "quality and innovation" of his/her work, rather than on the "where or how" it was published. Being based in the division of biostatistics allows for such expression, although according to this interviewee, scholars based in the department of statistics would need to yield a more traditional publication record.

The advancement process and new publication methods: a support or hindrance?

Responses from faculty were largely homogenous regarding whether the advancement process supports or hinders the use of new publication methods. Generally, it was perceived as a hindrance:

> For example, to go back to the issue of software, an excellent piece of software is still valued much less than a mediocre paper in statistics. Yet some pieces of software should be worth ten papers. So there are still some biases.

Interviewees pointed out that new publications need to gain prestige and a reputation irrespective of their traditional versus non-traditional status.

Opinions regarding whether the advancement process should support the use of new publication methods varied. Although it was felt by some interviewees that it should be supportive, others suggested that it must be "intellectual" and "communicate broadly" and, consequently, not change just for the sake of change:

> Berkeley is stuffy, and I suspect that they don't rate the electronic publications as high as the journal ones. I'm just guessing, but I'll bet you, you sit down on some promotion committee and the guy has all this stuff in electronic journals and somebody's going to say, 'Well, those aren't as good as the others.' And I think there's…perhaps a prejudice or perhaps something in fact.

The value of new forms of publication

Faculty agreed that less value is placed on new forms of publication, compared to traditional forms, and although the value system might change, this would take time. Non-traditional publications are viewed, often incorrectly, as "quasi peer reviewed" or "not peer reviewed" resulting in their lower prestige and status.

It is evident that although faculty consume newer forms of communication and publication, they tend not to disseminate their scholarly work in these outlets. For instance, despite the higher value placed on print publication, articles appearing in print form are often not read, having been accessed previously online via a preprint server.

B4. The evaluation of traditional and new forms of communication and publication

B4.1 Recent or current changes to the faculty reward systems

Faculty were unaware of any recent or current changes to the faculty reward systems to accommodate new forms of communication and publication. One faculty member reflected that other campuses within the University of California system hire scholars for their innovative approaches to scholarly work and stated that much is dependent on the value system of specific departments. Another interviewee pointed out that it is difficult to ascertain how to change publishing incentives for faculty:

> It is not clear how to change those incentives but it is clear that people perceive what is valuable currency. On the one hand, the university is 'the player' who is setting up the incentives because they are cashing in that coin for faculty. On the other hand, they are also the main 'consumer' in

> the form of the university library. The universities have the power to say, "we will judge your work separately. We will find some way of doing peer review that's independent of whether it's appeared in *Science* or not. And we'll therefore change the incentives for the faculty."

B4.2 The evaluation of new forms of communication and publication

Interviewees had varied opinions in relation to the evaluation of new forms of communication and publication. Although a couple of interviewees emphasized peer review, stating that newer forms should be evaluated in much the same way as standard forms, they suggested that newer forms of publication do not always lend themselves so readily to standard peer review. For instance, to evaluate software that appears in a non-traditional publication format, referees would have to download, run, debug and check the software, according to one interviewee.

One interviewee suggested that scholars in some fields—but not biostatistics—have the ability to evaluate the merit of scholarly work, irrespective of whether or not that work has undergone peer review:

> Maybe it's different in physics. I've heard arguments made that they can just put anything out there without peer review, and that the scientific community in physics can immediately evaluate it. If it isn't very good…people will just ignore it. It won't influence thinking, it won't lead to errors or anything like that, it won't get cited. It'll die by the wayside. Whereas the really significant piece that's just put out there is the one that's going to be picked up on, will be discussed at the next scientific meeting, and will get quoted…I don't know if it's true. But in other cases the key thing is the peer review process.

B4.3 The process of peer review: deterioration versus improvement

Opinions regarding peer review were split. For those who felt that the process of peer review had deteriorated, this was seen as a consequence of changes for the worse in academia including pressure to publish more: "the field is bigger, people are busier, and the process is more politicized." This was further compounded by the fact that "senior" scholars have less time to do peer review. As a result, younger faculty bear the burden, despite their more inexperienced position. Other interviewees did not perceive that the peer review process had either improved or deteriorated.

Peer review differs by field; in statistics, for example, the review process is conservative and more traditional whereas in newer fields the peer review process may be more open. A problem associated with the newer fields, however, is their interdisciplinary nature (e.g., computational biology). Selecting reviewers in this case is difficult since editors could call upon a computer scientist, a statistician, or a biologist to act as a referee. One interviewee explains:

> A statistician…is not suited to comment on the biological aspect of a paper, but can comment on the statistical methods. So you may need to assemble interdisciplinary teams of referees.

As a result, there is reliance on "external review for tenure," according to one interviewee, due to limited academics who are in a position to assess scholarly material within a department.

B4.4 The reward system and publishing practices: advice

When asked to suggest changes to the current reward systems or to the newer means of publication so that they mesh better, advice given was wide-ranging among the faculty and administrators interviewed. Two interviewees suggested that publications should not be counted *per se;* instead the substance of work should be evaluated: "we need to pay attention to the content of scholarly work and not to the hallmarks of scholarly research." Another faculty member suggested that the review process should be more open to

non-standard forms of publication and, consequently, more open to innovation and creativity despite the fact that these things are harder to evaluate. Moreover, the university must inform faculty that it will not support prejudice against the use of newer publication outlets:

> Send a signal that says, "we will reward you on the basis of your work…independently of how you choose to disseminate it….just get your work out there, in a high-impact way…be willing to experiment, but we will not hold it against you." That's a hard message to craft.

Although peer review needs to be maintained, faculty suggested that the university should alter how it deals with peer review. For instance, support could be given to scholars launching e-journals in competition with traditional commercial-based counterparts. If such journals received a stamp of approval from the university, this would serve to increase their prestige.

The Budget Committee could be more flexible in the way in which it evaluates 'impact.' For instance, interviewees suggested that the number of downloads of an article in an e-journal could be counted to indicate its popularity and it may be that downloads are a useful criterion, alongside more traditional citations, to inform the degree of impact.

Finally, a couple of interviewees perceived that the reward system at UC Berkeley is good compared to other institutions.

B5. An editor's perspective

Although a number of interviewees were associate editors or editors of conventional journals, only one interviewee was an associate editor of an online journal. Faculty editors were clearly aware of concerns about high journal costs. One interviewee discussed the case of a commercially owned journal in which two-thirds of the associate editors resigned because of the exorbitant journal cost. Consequently, a new rival journal, housed by MIT Press, was set up.

Interviewees suggested that younger faculty are unaware at times of the target audience of a journal and submit papers to inappropriate journals.

Although faculty editors believed that peer review was extensible to an online format, some editors mentioned that maintaining the anonymity of reviewers is problematic.[140] Other burdens of peer review include finding academics to act as referees and the sheer amount of time it takes to review papers.

B6. The state of e-publishing in biostatistics

Biostatistics is another emerging, hybrid discipline concerned with the application of statistical reasoning and methods to the study of health and disease (including topics such as epidemiology, clinical trials, and genetics). The discipline's publication model is much like that of biology and other hard sciences, with a focus on peer-reviewed journal publication. Biostatistics scholars often publish in biology, medicine, epidemiology, and mathematics journals, as well as in emerging biostatistics, bioinformatics, and computational biology journals. As a new and relatively technical field, biostatistics has made extensive use of online resources, not only for access to and publication of research articles but also in sharing data, software, and methodology.

[140] See article on exposure of peer reviewers' identities. Available at http://chronicle.com/wiredcampus/article/1156/peer-reviewers-identities-exp

B6.1 Emerging scholarly practices

Article Repositories and Collections

There are many options for biostatistics scholars to retrieve articles online, including a large number of postprint archives. Some postprint archives are maintained by university libraries, including Project Euclid,[141] a mathematics and statistics journal repository run by the Cornell University Library, and HighWire Press,[142] an open access repository of science journals including biostatistics and bioinformatics journals, run by the Stanford University Libraries. Others are non-profit organizations, for example BioOne,[143] a repository specifically for society-sponsored journals in the biological sciences (which might not otherwise have the resources to provide online access to their journals). Still others are government-funded, including PubMed Central, an NIH-sponsored postprint archive.[144] Indeed, the NIH has recently introduced a policy requesting that publications based on NIH-funded research be submitted to the PubMed Central archive.[145]

There is one preprint archive devoted specifically to biostatistics, the Collection of Biostatistics Research Archive (COBRA),[146] maintained by bepress, which solicits working papers from scholars and provides open access to content. A related open access repository is arXiv,[147] funded by Cornell University, which does not have a section specifically for biostatistics but which does include both quantitative biology and mathematics sections.

Another innovative service is Faculty of 1000 Biology,[148] a site providing peer evaluations and recommendations for articles in a variety of topic areas, including bioinformatics. It is not a postprint repository, but does provide links to those articles that are available in other online repositories.

Data collections

There are a large number of online data sources available to biostatistics researchers, including databases of health and census data and a variety of statistical software.[149] Many of these are epidemiologic and census datasets and related statistical packages, compiled and maintained by government agencies, the United Nations, or the World Health Organization. An extensive list of such resources has been compiled by Emory University's Rollins School of Public Health.[150] Notable non-governmental data repositories include the Data and Program Library Service, a repository of datasets submitted by researchers, maintained by the University of Wisconsin-Madison,[151] and the Australian Social Science Data Archive, maintained by the Research School of Social Sciences at the Australian National University, also a collection of researchers' datasets.[152] Another service is the open access Integrated Public Use Microdata

[141] http://projecteuclid.org/Dienst/UI/1.0/Home
[142] http://highwire.stanford.edu
[143] http://www.bioone.org
[144] http://www.pubmedcentral.nih.gov/
[145] http://www.sciencemag/org/cgi/content/full/306/5703/1895
[146] http://www.biostatsresearch.com/repository/
[147] http://xxx.lanl.gov/
[148] http://www.f1000biology.com
[149] Producing software has become an increasingly common scholarly activity among biostatistics faculty.
[150] http://www.sph.emory.edu/bios/bioslist.php
[151] The datasets themselves are not available online; researchers must request them. Many of them are available on CD-ROM. http://dpls.dacc.wisc.edu/archive.html
[152] Access to these datasets is free to institutions that are members of the Australian Consortium for Social and Political Research Incorporated; otherwise there is a fee for downloading data. http://assda.anu.edu.au/index.html

Series (IPUMS), maintained by the Minnesota Population Center at the University of Minnesota.[153] The IPUMS is a sophisticated extraction tool for census data, which allows users to specify data fields and format and then download these customized datasets.[154]

Topic-specific online data projects also exist. One example is the Ares Lab Yeast Intron Database, maintained by faculty at the University of California, Santa Cruz.[155] This database is a listing of specific segments of the genome of one particular strain of yeast, of use to researchers studying certain kinds of genetic processes; it was created by faculty including biologists and bioinformatics specialists. Another is the Universal Protein Resource (UniProt),[156] a comprehensive repository of protein sequence and function information, provided free under a Creative Commons license.

B6.2 E-publishing venues

Online Journals

There are a relatively large number of online journals available to biostatistics researchers. The Directory of Open Access Journals[157] lists 89 biology journals, of which 12 are related to bioinformatics. The earliest of these was founded in 1998.

One notable publisher of open access journals is BioMed Central,[158] a commercial publisher which publishes 160 peer-reviewed journals, most of which use an author-pays model. BioMed Central publishes seven bioinformatics journals, with topics including genomics, molecular biology, and immunology. Another open access publisher is the Public Library of Science (PLoS), founded in 2003.[159] Among its seven journals is *Computational Biology*, published in partnership with the International Society for Computational Biology and focused on an "understanding of living systems at all scales through the application of computational methods."[160]

There are also emerging journals intended for the publication of biostatistical methodology, including software and software notes, for example *Statistical Applications in Genetics and Molecular Biology*, an open access bepress journal,[161] and the *Journal of Statistical Software*, an open access journal published by the UCLA Department of Statistics and the American Statistical Association.[162] A more general journal, *The International Journal of Biostatistics*, has recently been launched by bepress. [163]

An important feature of *Statistical Applications in Genetics and Molecular Biology* is that it has started to publish articles containing content that is loosely referred to as *reproducible research*; these papers

[153] http://www.ipums.umn.edu/
[154] There are also similar sites which provide data about more specific populations, such as the Annie E. Casey Foundation's Kids Count Census Data Online, http://www.aecf.org/kidscount/census/, a search tool for census data about children, and the National Cancer Institute's Surveillance Epidemiology and End Results, http://seer.cancer.gov/, which provides a cancer statistics database and a software package, SEER*Stat, for working with the data.
[155] http://www.cse.ucsc.edu/research/compbio/yeast_introns.html
[156] The UniProt Consortium is comprised of the European Bioinformatics Institute, the Swiss Institute of Bioinformatics, and the U.S.-based Protein Information Resource; http://www.pir.uniprot.org/
[157] http://www.doaj.org
[158] http://www.biomedcentral.com/home/
[159] http://www.plos.org
[160] http://compbiol.plosjournals.org/perlserv/?request=index-html&issn=1553-7358
[161] http://www.bepress.com/sagmb/
[162] http://www.jstatsoft.org/
[163] http://www.bepress.com/ijb/

contain software code (and are linked to appropriate compilers) so that "readers" are actually running software programs when they access the paper, programs that analyze data and produce results and plots for relevant data analyses. Clearly, publication of reproducible research is only feasible in an electronic outlet. Growth in reproducible research is likely as other journals seek to improve the data quality of their publications. For example, some journals are beginning to assess the need for independent statistical analysis for papers whose conclusions depend crucially on statistical procedures. This topic is also related closely to the increasing demand for open publication of data and meta-data that supports a publication's thesis.

B6.3 Institutional support

As described, there are a number of governmental and non-governmental agencies and universities which provide support for online data archives, preprint and postprint servers, and online-only, open access journals in fields relevant to biostatistics researchers.

The National Institutes of Health is prominent among these, beyond its maintenance of PubMed Central. In collaboration with the National Library of Medicine, the NIH maintains the National Center for Biotechnology Information (NCBI).[164] The NCBI carries on a number of projects, including the creation and support of public databases (for example, a genome database), development of software for analyzing genome data, a visualization tool for biomolecular structures, provision of online search systems for molecular biology information, and tutorials in the use of these various resources.

Another of the NIH's initiatives is the Biomedical Informatics Research Network (BIRN).[165] BIRN coordinates the pooling of data from a variety of participating research centers across universities, making large-scale analysis of these pooled data possible. Thus, its main activities include development of the software and computer technologies necessary for data sharing and data integration across many sites.

Finally, another emerging resource is online courses in bioinformatics; a number of these distance-learning courses are available through various universities. For example, S* (S-star)[166] is an international collaboration among eight universities (including, in the U.S., Stanford and UC San Diego), aimed at providing a unified course structure for online courses in genomics, bioinformatics, and medical informatics. The International Society for Computational Biology (ICSB) also provides online bioinformatics courses, through the University of Manchester.[167]

[164] http://www.ncbi.nlm.nih.gov/
[165] http://www.nbirn.net/
[166] http://s-star.org/
[167] http://www.iscb.org/olCourse.shtml

CASE STUDY: LAW AND ECONOMICS

L1. Introduction

L1.1 Background

Law and economics (the intersection, not the sum, of the two fields) is an emerging field consisting of scholars originally trained in either legal scholarship or economics. As such, scholars working in this area publish in the traditional student-edited law reviews, in peer-reviewed economics journals, and in peer-reviewed law and economics journals. There is some book publishing, but generally it is an article-based discipline. Law and economics scholars also routinely disseminate their work as working papers, most often through a variety of online working paper series.

L1.2 Profile of interviewees

The interview data are drawn from seven interviews conducted between November 2005 and March 2006 with five faculty members and two administrators. Four of the interviewees were also editors.

L2. Publishing models for each discipline; the needs of the discipline and how the publishing model fits these

L2.1 Perceptions of traditional and non-traditional forms of communication and publication

Traditional forms of communication and publication

Traditional forms of communication in law and economics include student-edited law reviews and peer-reviewed economics journals, as well as a relatively smaller number of peer-reviewed journals geared specifically toward law and economics. Books seem to be an important but somewhat less common venue. Journals in related fields such as philosophy and history are also used sometimes by scholars who do interdisciplinary work. Interestingly, when asked to list "standard" forms of communication in the discipline, two interviewees included the posting of articles on the Social Science Research Network (SSRN), the National Bureau of Economic Research (NBER), or university working paper series.

Issues related to student-edited law reviews

The standard practice of students editing law reviews makes law and economics a particularly idiosyncratic discipline; faculty publish in both student-run reviews and peer-reviewed economics journals. Faculty had somewhat differing opinions regarding student editing. One interviewee stated that student-edited law reviews is an established practice that is not likely to change, whereas two others mentioned the increasing number of moderately successful peer-reviewed journals that are in competition with student journals.

The practice has solid advantages, including: the speed with which work gets published, in part due to the fact that articles can be submitted to multiple journals at once, generating competition among journals; the fact that students are open to new ideas and do not bring in the same kinds of editorial biases as do established scholars; the educational value for the students themselves; and the cost-savings realized because these journals do not have to hire reviewers.

Interviewees differed in opinion regarding whether student reviewers provide better or worse reviews than faculty would. One interviewee discussed the depth with which students typically review work,

including checking every citation, such that work which misrepresents or misquotes other work cannot get published. In contrast, another interviewee perceived that articles in student-edited law reviews were not subject to the same level of scrutiny as economics articles. Related to this idea, one interviewee said that s/he would never publish an article that included statistics or econometrics in a law review, because such work needs peer-review both for accuracy and to send a strong signal about its quality. Two others discussed differences in the types of papers student-run journals will accept; one interviewee perceived that faculty editors would have more sophisticated judgment selecting papers while the other stated:

> All law reviews are student-edited and only loosely sort of peer-reviewed. It's very tough to get into them, just because they get 1,200 submissions for 12 slots, but it's very quirky. And nobody believes that a paper that appears in the *Harvard Law Review* is necessarily better than a paper that appears in the *UC Davis Law Review*. It can be what's trendy; students often don't know what's good. Lots of jazzy but pointless stuff that most scholars think (of) as ridiculous appears in the *Harvard Law Review.*

Non-traditional forms of communication and publication

Law and economics faculty discussed several non-traditional methods of publication. In particular, six interviewees mentioned the ability to post working papers on SSRN and the Legal Scholarship Network (LSN),[168] among other outlets.[169] This type of venue appears to be a key means of disseminating scholarly work, though one interviewee emphasized that the only really "new" forms are exclusively electronic; many traditional publications also have online versions. As one faculty member stated, "People post their working papers on servers. And that's, I think, the way most works are actually disseminated, as working papers." Such outlets are not peer-reviewed, however, and thus, it is not a substitution for publication. Possibly because of this, most papers posted in such outlets are eventually published in "formal" journals.

Interviewees also mentioned other types of non-traditional publications including electronic versions of print publications, such as the *Journal of Legal Studies*, as well as electronic-only journals, such as the bepress journals. One interviewee perceived that electronic-only journals are beginning to appear in economics only, not in law. Another faculty member was aware of a few attempted online journals, though none has been successful to date. One interviewee believed that blogs were becoming more common, but did not believe that these are venues for the dissemination of scholarly information.

Interviewees themselves had posted their own working papers as well as traditionally published papers on servers such as SSRN, and at least one had also posted published papers on both a departmental website and his/her own website. Two interviewees had published in electronic-only journals. There is evidence, however, that law and economics faculty may move more quickly into newer forms of communication than those in other disciplines, based on the fact that most interviewees used and spoke highly of preprint servers as they discussed newer forms of communication and publication. One interviewee stated:

> There's less resistance, I think, among the law and economics faculty than in other fields… They seem to be ahead of the curve… I'm speculating, but I think it's maybe because there's a little bit more sensitivity to the evolving practice in social sciences than for other legal scholars.

[168] The LSN is one of several preprint servers housed within the SSRN; however, the interviewee who mentioned both did not make this distinction clear, and appeared to be discussing these two outlets as though they were separate entities.
[169] Other outlets mentioned included JSTOR and the Berkeley School of Law's faculty website.

Later, this interviewee also commented:

> It would be wonderful if we could advance the acceptance of alternative forms of publication as quickly as possible, because certainly my interest is in getting things out the door and into public use. And the delays of publication are, while not crippling, for much of the work that I'm interested in doing, which is scholarship that has an impact on policy, you want to try to be timely.

Another interviewee voiced a similarly positive opinion:

> Sooner or later, electronic journals have to become dominant or at least very important, but to make it happen, I think you need something to kick-start it. I suspect you need some top people to invest in it and decide that's where they're going to put at least some of the stuff that they think is most important, to cause some people to go read it.

L2.2 Perceptions of journal and publisher prestige, publishing models, and accessing new publications

Journal and publisher prestige

As a hybrid discipline, law and economics has three distinct channels through which scholars publish: law reviews, economic journals, and the interdisciplinary journals that focus on the hybrid of law and economics. The latter have been historically somewhat less prestigious than the top journals in law or economics; thus, interviewees often provided two sets of answers when asked to list the top journals in their field. Despite this complicated structure, there was a surprisingly high level of agreement in responses when interviewees were asked to name the most prestigious journals and publishers.

In naming prestigious law reviews, there was particularly striking agreement. *Harvard Law Review* and *Yale Law Journal* were listed in this order as the top two by all interviewees who discussed law journals. Opinions diverged on the third most prestigious; two interviewees named *Stanford Law Review*, one named *Chicago Law Review*, and a third stated that it would be "some other law review, depending on which school you like." One interviewee also stated that it is sometimes preferable to publish in a specialty review rather than a more prestigious general review, depending on the scholar's desired audience.

Though only two interviewees discussed specifically the prestige of book publishers, they again agreed that Chicago, Harvard, and Oxford university presses were top tier, though one pointed out that "university presses are more prestigious than trade presses, but apart from that it doesn't matter."

Finally, only two interviewees specifically named prestigious law and economics journals, but again they agreed. Both named the *Journal of Law and Economics*, the *Journal of Legal Studies*, and the *Journal of Law and Economics and Organization* as top journals. Interestingly, one interviewee stated that this is a difficult question to answer, because there are so many specialty fields. Interviewees also agreed that law and economics journals put forth by scholarly societies are not more prestigious than journals from other sources.

Publishing models: open access and author-pays

Interviewees were open to the idea of both open access and author-pays publishing models. They seemed not to have had much experience with such models but were generally in favor of such models in principle. As one interviewee expressed:

> I'm in favor of trying lots of different approaches to break the back of this…inflation spiral in general publication costs. I don't know what the right way of doing it is, so I think that all of these experiments are worth trying… I haven't formed an opinion yet, but I'm for the experimentation.

Another interviewee said about open access, "in some sense, it is the truest way of sharing ideas." Interviewees, however, seemed to be working out their ideas about these issues, for example:

> [Open access] would be fabulous… somebody's got to decide what gets in and what doesn't… in most fields, that's done for free by other academics… So I guess all you really need is somebody to manage the process, so it could be pretty inexpensive.

Possible concerns about such models centered on the ideas of how quality-control or prestige issues would be handled, how subject matter would be sorted, and how the process would be funded. These issues were discussed in the context of problems to solve rather than deal-breaking barriers, though two interviewees cautioned that they would not want these to be the exclusive models for dissemination. Faculty were particularly cautious about the author-pays model, which seemed to be contradictory to open access goals; however, opinions were not entirely negative. As one interviewee expressed:

> I guess I have mixed feelings about [author-pays models]. If journals really use them to defray costs and to defray subscription costs, so that it actually expands distribution on the other end, I don't have a huge objection to the per-page charges and to the author-pays models. I do think that… But you do have access issues. Independent scholars may not want to pay the per-page charge… [Submission fees] will stop independent scholars and scholars of poor institutions that don't have those kinds of budgets; foreign scholars for whom $100 is simply impossible in some jurisdictions. I don't like the barrier that that creates.

Accessing new publications

Law and economics faculty seem to acquire the majority of the articles they read from online sources, often through email notification services such as the ones run by SSRN, but also through online searches via outlets like Google, Westlaw, and Lexis. Two interviewees noted that they still receive some paper subscriptions. One said that the paper versions are much less important than the online services, but s/he keeps the subscriptions because, in rare cases, s/he comes across a paper of interest that s/he had not heard about already. Another interviewee commented that s/he does not receive paper subscriptions, and that "I can't remember the last time I read a journal article out of a journal, as opposed to reading it on my computer or printing it out and reading it." Two interviewees stated specifically that they use online search engines to find published articles rather than go to the library. Another interviewee continues to subscribe to the library's circulation of new hard copies, but noted that it is not common among most young faculty because they can view the same table of contents online.

L2.3 Perceptions of data storage and preservation

Types of data produced

Interviewees reported two main types of data commonly found in law and economics work: case studies or sociological interviews, and statistical, "number-crunching" data. As interviewees explained, though an

increasing amount of research is based on new data collected by faculty, most research is still based on datasets that are already available, such as data from government agencies. As one interviewee pointed out, "I carefully avoid projects that involve going out and getting data from scratch."

Data storage and preservation arrangements

Interviewees did not report that data storage is a dilemma. They stored data on their own computers, and backed up important data on CD-ROMs or on the network server. In general, faculty work does not seem to be particularly data-heavy, making storage a relatively minor issue. One faculty member suggested that there is a distinction between short-term storage needs and long-term solutions:

> I don't think that's a big issue right now… There is concern over the long period, over long periods of time, you know, how well does electronic storage work? What forms will preserve things? And I think it's a growing concern, but I don't think right now it's a major concern.

Data storage and preservation guidelines

Interviewees had not encountered any requirements by funders or other entities regarding data storage. One did not have any grant funding, and three other faculty who worked with foundations simply had never dealt with any such requirements. No formal arrangements for data preservation are in place at UC Berkeley.

L3. Driving forces behind why faculty publish where they do

L3.1 Perceptions of advantages and disadvantages associated with newer forms of communication and publication

Advantages associated with newer forms of communication and publication

Interviewees concurred that one of the main advantages was the speed with which one's work could be made available to others, particularly with the use of preprint servers, which in part provides proof of concept As one interviewee summed up, "I don't have to wait until my article comes out for people to know that I've worked on something and made a contribution. It's out there in the market." Speed is also an advantage on the reader's side and one interviewee provided an example:

> So I'm in the midst of writing a very long paper with a colleague… We just, at this advanced stage in our writing, saw last week a paper come up on SSRN. So instead of having to hear about it by word-of-mouth, see it at a seminar, write to the professors at (that institution) and have them mail us a copy or specifically email us a copy, we get notified by SSRN.

Faculty pointed out other advantages, particularly in relation to potential audience, such as the ability to publish a greater number of articles and the size of the potential audience. These are beneficial not only for wider dissemination of a scholar's work but for the unprecedented ability to get feedback quickly in the form of download counts and online commentary, and the possibility of more robust communication around the scholarly material:

> Now, instead of having comments from the people I've sent the paper to, from the referees, from seminars where I've presented it, I can get comments from all kinds of people, people I don't necessarily know, and I can learn a lot, I can get a lot of different perspectives. So the feedback is a lot greater.

This interviewee further commented that during the formal publication process, authors can now refer an editor to online reviews if clarification is needed. This was seen as beneficial because there is "more of a market process that's brought in to validating the research and to responding to the research, and I think that's a very healthy thing." Another interviewee noted similarly that online discussions and feedback on early drafts is a great advantage of preprint servers, while a third pointed out that online law journals are peer-reviewed typically rather than student-reviewed, so that the review process is more sophisticated.

Finally, interviewees discussed how newer forms of communication have the potential to facilitate access to scholarly debate by facilitating access among international scholars who often have fewer resources to acquire material. This can be done at little cost to the provider and reduces entry barriers such that scholars at less prestigious universities can have their work disseminated, creating potentially more of a meritocracy. Online dissemination compares favorably to the expense and inefficiency of paper journals, and, as one interviewee pointed out,

> The Internet has…the ability for scholars to take back, effectively, ownership of how their work is distributed. I, as a scholar, don't have any interest in having a high price for the journal my work is in. My interest is in getting my work out there.

Disadvantages associated with newer forms of communication and publication

Interviewees identified disadvantages mainly related to issues of prestige or the advancement process. Five interviewees mentioned such concerns, including perceptions of electronically published work, whether other scholars would read electronic publications, and the newness factor given that any new journal is at a disadvantage in terms of prestige. As one interviewee expressed, "the problem is, I'm not going to publish with an online journal that nobody reads and nobody's going to read an online journal that nobody publishes in." This is further complicated by common assumptions about online-only journals. As one interviewee explained:

> I think now in many fields, people still have an assumption that if it's only published electronically, then it's not first-rate, and that anything that's truly first-rate can find a conventional publication channel and should.

Other interviewees pointed out disadvantages inherent in electronic forms. Two faculty believed that using download counts to measure an article's worth is problematic because such counts can be and have been manipulated, for example by asking friends to download an article, and beyond that, "there are times when it's not even measuring the quality of the work, it's more like a popularity contest." One interviewee mentioned the risk of giving away one's ideas by posting working papers; for instance, if an author takes an idea first presented by another scholar and is the first to publish in a traditional journal, the author will get most of the professional credit. This fear may be partially alleviated by the fact that SSRN is now viewed as a reasonable venue to cite. One steering committee member also discussed the potential lack of quality-control filters in online dissemination.

L3.2 Perceptions of factors influencing choice of publication venue

Seniority

Several interviewees perceived that senior faculty in general are not much inclined to use newer outlets of communication. Some interviewees, however, were of the opinion that there are a good number of senior academics who use newer outlets at least on occasion; one of these stated that senior scholars are not lagging behind: "It's not like they're doing things differently than the junior people."

Making a name for oneself both nationally and internationally

Making a name for oneself in law and economics was described as a twofold process. First, a scholar must find a niche, an important and timely topic or the kernel of a new idea, and mine that idea; one interviewee described this as "sparkle." The other means of establishing one's reputation required disseminating one's ideas, primarily through publication of high-quality work in prestigious journals, but also at conferences or workshops, which keeps work visible. One interviewee also mentioned the possibility of making a name through legal practice or policy reform, though s/he stated that it would be difficult to build a reputation among academics if one were doing exclusively practice-oriented work.

Interviewees also commented about the breadth of scholarship. One interviewee warned against focusing too narrowly on a small niche, because most academics have more admiration for people who have made contributions in several areas. Another discussed the importance of working a single idea both deeply and broadly and branching out over time, pointing out that most academics cannot have the breadth to work deeply on more than two or three areas.

In general, these concerns affected somewhat interviewees' choice of publication venues, particularly with regard to making work quickly accessible to the appropriate audience. Interviewees noted these strategies: posting several articles on SSRN for quick dissemination, choosing high-visibility journals, and placing a premium on journals rather than books, because it is easier for readers to come across or search for journal articles and because "typically when you get into an edited book, it's by invitation, and so there's more of a presumption that you're going to get accepted…[though] there's a lot to be said about the fact that you've been invited." One interviewee, however, did not believe that concerns about making a name for oneself affects choice of publication venues. S/he perceived little frustration with publication delays because they are relatively short, and that anyone can find an article in even an obscure journal, thanks to searchable databases like Westlaw and Lexis.

The requirements for advancement with regard to publication

Requirements for advancement in the field of law and economics require two parallel actions. Scholars have to first demonstrate national and international leadership in the field; UC Berkeley scholars, in particular, must be among the top people in their fields. Faculty also must publish a large amount of work, though there is no concrete numerical cutoff.

Differences in standards between law schools and economics departments were important for law and economics faculty. Some interviewees mentioned the fact that law schools have had lower requirements historically than other disciplines with regard to the number of publications expected, though this is changing. As a result, law and economics faculty tend to be relatively high producers, compared to traditional law faculty. Interviewees also identified the important differences in how quality is determined. In economics, there is consensus regarding what constitutes a good article, but the same consensus does not exist in law; consequently, there are deep differences between faculty regarding methodology and writing styles.

Interviewees in general perceived that requirements for advancement have an influence on choice of publication venue, specifically regarding the need to aim for high-profile journals and to publish in venues where one's work will be widely accessible. One interviewee summarized, "you want to balance between your chances for publication, for getting accepted and getting the work out, and the prestige of the journal."

The advancement process and new publication methods: a support or hindrance?

One interviewee considered the advancement process neutral with regard to online publication, others considered it to be a clear hindrance, and others fell somewhere in the middle, noting that the advancement process is somewhat conservative or that it probably does make a difference of some kind. One interviewee noted that the advancement process should be supportive of newer forms of publication, contingent upon clear editorial standards for peer review and acceptance.

One interviewee who considered the advancement process a hindrance cited specific fears related to how the Budget Committee regards law faculty:

> I don't know that there's any evidence, but I think it's a legitimate fear that… from a law perspective, we don't trust the Budget Committee. We don't think they understand our field [thus] I think it would be risky for us to start doing things in this area [new forms of communication] that were less conservative than the rest of the campus, more adventuresome than the rest of the campus.

An interviewee perceived the Budget Committee would likely be a "big dampener" of innovation in scholarly communication, because they are likely to "be irrational" if they do not have the traditional signals of publication placement.

L4. The evaluation of traditional and new forms of communication and publication

L4.1 Recent or current changes to the faculty reward systems

One interviewee perceived a growing acceptance of electronic publication for advancement, and noted that it would be useful to make it clear in the advancement guidelines how such work should be taken into account and how to decide if an online journal is legitimate, because there has been uncertainty about this. None of the six interviewees who were asked was aware of any changes to the reward system to accommodate new forms of communication, though one recalled that the Council of Deans had discussed the issue once.

L4.2 The evaluation of new forms of communication and publication

Interviewees expressed a number of opinions regarding how new forms of publication should be evaluated, which reflected the same mechanisms by which traditional journal quality is evaluated. Criteria identified in a journal's evaluation and selection mechanism include: whether it is peer-reviewed; the quality of the editors or the standards of the institution running the journal; and the pool of submissions the journal is receiving, including the number of submissions. As one interviewee stated:

> I think they can be evaluated the same way anything else is. There's nothing magical (about) being on paper, but you've got to figure out whether the journal is good… You need categories, so that somebody has vouched for the quality of a given paper.

Some interviewees expressed the belief that published work in any form must be read and evaluated ultimately on its own merits, particularly when it comes to tenure and promotion.

L4.3 The process of peer review

Importance of peer review

Three interviewees discussed the importance of peer review and perceived this as an important part of scholarly communication. They also recognized, however, that student-edited law reviews create complicating factors. One interviewee commented that scholarly work cannot be evaluated "without some kind of peer review," but pointed out that peer review comes after the fact in student-edited law reviews, particularly with regard to advancement. Another interviewee addressed the irony of current debates regarding whether newer peer reviewed law journals are as prestigious as the student-edited *Harvard Law Review*. A third pointed out the importance of the established pecking order among traditional law reviews and stressed that because electronic outlets lack such a measure, they must be peer-reviewed or they will be suspect.

Deterioration versus improvement in the peer review process

Two interviewees did not have an opinion regarding changes in the peer review process, both stating that they rarely or never publish in peer-reviewed outlets. A third perceived improvement in the peer review process, especially with regard to increased tolerance of scholarly styles and interests that are outside of mainstream legal academia, and cited law and economics as well as post-modernism as two examples. Thus peer-review has become more genuine and less a means of fighting over method or ideology.

Other interviewees perceived both positive and negative changes. One faculty member noted that there is increased pressure on reviewers to work quickly, citing shorter deadlines and greater incentives for reviewing, such as small payments. S/he speculated that this urgency is the result of articles that circulate as working papers and publishers' need to disseminate while there is still interest. In contrast, another interviewee noted that the time to get articles reviewed, often over a year, has increased and this was seen as problematic. Positive changes included increased anonymity among authors, which reduces bias in the reviewers, and the ability to disseminate scholarly writings online as working papers.

L4.4 The reward system and publishing practices: advice

Two interviewees did not perceive the need for change. Another interviewee suggested that there was no problem in meshing the reward system with newer means of publication, and the other thought that:

> there might be a cause to either encourage the creation of online journals or discourage the creation of online journals, but I don't think that's any reason to alter the reward structure for people who are trying to be academics. I think you've got to figure out the same thing we've always tried to figure out, which is how good is the stuff they've done, how good is the stuff they're going to do in the future, and on that basis, make decisions.

Other interviewees commented that they would like to see more encouragement of new forms of publication. They perceived that such change would need to be centered within the institution and suggested that: the institution should be more supportive of new forms, for example, by including them in what counts as service to the profession, on a par with service on editorial boards; tenure and promotion committees should put more emphasis on the quality of the individual work and the quality of a journal's editors, rather than the quality or venerability of the journal the work is in; universities should provide resources (money or time off from teaching) for faculty who want to found new journals; and the centralized faculty personnel system should allow more deference to the judgments being made within the discipline rather than within the units, because the discipline is better able to judge the quality of emerging publications.

One interviewee also mentioned that new forms of publication should be somewhat formalized, to ensure effective quality control.

L5. An editor's perspective

Four interviewees had been editors, either of journals or books, and one of these had also been a law review editor as a student. Of the three who were questioned, none perceived that online journals would cause any particular problems for peer-review, excepting the possibility of overly lengthy articles though a good peer-review process might prevent this. Three interviewees did not express confidence that online journals could solve any of the problems editors face currently (e.g., referees missing deadlines or not doing thorough reviews). A fourth interviewee perceived the possibility of increased pay for editors owing to reduced expense for the production of online journals.

L6. The state of e-publishing in law and economics

L6.1 Current scholarly practices

Law and economics is a relatively new interdisciplinary field consisting of both legal scholars and researchers trained in economics.[170] Law and economics scholars publish in student-edited law reviews, peer-reviewed economics journals, and peer-reviewed law and economics journals. There is some book publishing, but generally it is an article-based discipline. Law reviews are typically still paper-only subscriptions, but economics journals and law and economics journals offer online subscriptions generally. Law and economics scholars also circulate working papers routinely. In the last decade or so, working papers have migrated to online preprint servers, and many scholars make extensive use of these. Law and economics relies heavily on easy and timely channels of access to published works in varied fields and institutions. Technological innovations have focused primarily on collecting and indexing articles.

L6.2 Emerging scholarly practices

Law and economics scholars carry out research both by collecting original datasets and by mining data sources such as public records and case law. On occasion law and economics scholars conduct their own experiments and/or surveys. A number of venues for searching case laws have emerged online.

Portals

One venue for finding information is LexisNexis, which provides searchable databases of information including public records, tax and regulatory publications, legal documents, case law, and statutes in online, print, or CD-ROM formats.[171] Another is FindLaw, a legal website which provides access to case law, codes, and legal news, as well as email newsletters, message boards, and a secure document management utility.[172]

[170] The American Law and Economics Association was founded in 1991, and has published the American Law and Economics Review since 1999. Its membership includes academic and practicing lawyers and economists.
[171] http://www.lexisnexis.com
[172] http://www.findlaw.com

Databases

There are a wide range of databases which supply large amounts of empirical quantitative data for analysis. These include databases run by the government, such as the Bureau of Labor Statistics;[173] FedStats, a portal to federal government statistics from over 100 federal agencies, including information such as economic and population trends, education, health care, and foreign trade;[174] and the U.S. Small Business Administration, which provides a wide range of data on small businesses.[175] Other databases are run by university faculty, including the Bankruptcy Research Database, which enables users to design and execute data analyses on a dataset of public company bankruptcies;[176] the Contracting and Organizations Research Institute, which provides searchable access to more than 75,000 contracts and contract forms;[177] the Legal Information Institute, providing Supreme Court and other court opinions and a collaborative law dictionary/encyclopedia, among other legal documents;[178] and the Inter-University Consortium for Political and Social Research, which provides datasets on a wide range of topics including economic behavior and legal systems.[179] Finally, the National Bureau of Economic Research, a private nonprofit research organization, provides access to large economics datasets such as demographics, trade data, and survey data.[180]

L6.3 New publishing venues

Online Journals

The established law and economics journals offer online subscriptions and back issues, but maintain a hard copy version.[181] There is one online-only journal available in law and economics that publishes peer-reviewed research articles: the *Review of Law and Economics*, published by bepress in association with the European Association of Law and Economics.[182]

Economics journals also tend to maintain hard copies and supply an online access option, and one, the *Journal of Applied Econometrics*, makes additional use of online capabilities by requiring that its authors submit their original data to the journal's online data archive.[183] There are two online-only, peer-reviewed economics journals. One is the *Economics Bulletin*, which publishes a wide diversity of subject areas, including law and economics.[184] The second is *The Economists' Voice*, a bepress journal that offers short columns by economists, intended for a general interest readership.[185]

[173] http://stats.bls.gov/
[174] http://www.fedstats.gov
[175] http://www.sba.gov/advo/research
[176] The site was created and is maintained by a UCLA law professor; http://lopucki.law.ucla.edu
[177] http://cori.missouri.edu
[178] The site is published by Cornell Law School; http://www.law.cornell.edu
[179] http://www.icpsr.umich.edu
[180] http://www.nber.org/
[181] These include the *Journal of Law and Economics*, the *Journal of Legal Studies*, the *Journal of Law, Economics, and Organization*, the *American Law and Economics Review*, the *International Review of Law and Economics*, the *European Journal of Law and Economics*, and *the Journal of Empirical Legal Studies*. Some of these house their back issues on JSTOR; others offer back issues through the publisher's website.
[182] http://www.bepress.com/rle
[183] http://qed.econ.queesu.ca/jae
[184] http://www.economicsbulletin.com/
[185] http://www.bepress.com/ev

Student-edited law reviews are typically still paper-only,[186] though some have begun to offer back issues online, and the Electronic Law Journals project, established in 1995, publishes three open access, peer-reviewed law journals on different specialty law topics.[187] Some scholars are offering the full text of their articles on their personal websites also.[188]

e-Books

Law and economics is mainly a journal-based field, but established scholars will often publish books as well. There are some books that have been published electronically, two of which are through Edward Elgar Publishing.[189] Again some scholars also offer chapters or the full text of their published books on their personal websites.

Working Paper and Preprint Repositories

Working paper repositories and post-print servers are heavily used in law and economics. Perhaps most notable among these is the Social Science Research Network (SSRN),[190] which includes several topical repositories such as the Legal Scholarship Network and the Economic Research Network. SSRN posts preprints, post-prints, and abstracts, and maintains a community directory. The Legal Scholarship Network has a large section devoted to law and economics papers and linking to working paper series from 21 law schools. The Economic Research Network includes the working paper series of programs such as the Center in Law, Economics, and Organization at USC. SSRN charges a small university subscription fee. It offers most full text papers free to subscribers but also links to published papers for which the publisher charges a download fee.

Other repositories include:

- The National Bureau of Economic Research (NBER),[191] a working paper clearinghouse that posts about 700 papers per year, including papers in law and economics, and which charges a university subscription fee. The NBER publishes traditional journals and books also.
- The New England Law Library Consortium,[192] provides access to working paper series, presentations, and other scholarship by faculty at 25 member law schools. It includes the Yale Law School John M. Olin Center for Studies in Law, Economics, and Public Policy Working Paper Series, and the New York University Law and Economics Working Papers series.
- Research Papers in Economics (RePEc)[193] is an open access, decentralized international database of working papers, journal articles, books, and software components. It is run by volunteers in 54 countries, and works by inviting institutions to create RePEc archives. RePEc also collaborates with the American Economic Association's working paper series. Scholars have created tools to work with RePEc, including ways of counting citations[194] and downloads[195] and allowing scholars to create personal profiles.[196]

[186] These include some of the most prestigious reviews: the Harvard Law Review, Yale Law Journal, Stanford Law Review, NYU Law Review, and Chicago Law Review.
[187] http://www2.warwick.ac.uk/fac/soc/law/elj/
[188] For example, http://www.daviddfriedman.com/Academic/Academic.html
[189] These are the *Elgar Companion to Law and Economics*, by J. G. Backhaus, and the *Encyclopedia of Law and Economics*, http://encyclo.findlaw.com/
[190] http://www.ssrn.com/
[191] http://www.nber.org/
[192] http://lsr.nellco.org/
[193] http://repec.org/
[194] http://citec.repec.org

- The American Economics Association's EconLit,[197] an electronic bibliography of economics journals, including several law and economics journals. EconLit includes abstracts and links to full-text articles; it also provides abstracts and indexes for book chapters, working paper series, dissertations, and book reviews. It can be accessed via either institutional or individual subscription.[198]

Additionally, many universities offer their own law and economics working papers series online, including the University of Chicago,[199] Harvard,[200] Columbia,[201] and Berkeley.[202] UC Berkeley's bepress also maintains a larger, open access Legal Repository,[203] including the working paper series of many universities as well as some associations (e.g., the American Law and Economics Association) and law firms. Finally, the Office of Economic Research, in the U.S. Small Business Administration, maintains its own working papers series.[204]

Community

Some types of informal online communication networks are widely available to law and economics scholars. For example, almost all of the repositories listed above provide customized email notification services, and scholars can sign up to be notified about new papers in specific subject areas. Conference papers are also becoming available online. Papers from the 2004, 2005, and 2006 American Law and Economics Association annual meetings are available online through bepress; in addition to submitted papers, any meeting attendee can post up to three of their own papers in a section titled Authors' Bazaar.[205] The European Association of Law and Economics[206] and the Israeli Law and Economics Association[207] post conference papers online also.

In addition, blogs have begun to have an impact in some areas of law and economics, particularly those for which the timeliness of new information is important. An example of this is in studies of the juncture among law, public policy, and the economics of property issues, an area in which there is a large amount of pending litigation, legislation, and government reports.[208] Blogs tend to link to one another, and in some cases have begun to be more formally organized, for example through the Law Professor Blogs website, a network of blogs organized topically (including a law and economics blog).[209]

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[195] http://logec.repec.org
[196] http://authors.repec.org
[197] http://econlit.org
[198] The individual subscription provides a CD-ROM version of the content.
[199] The John M. Olin Program in Law & Economics Working Papers, http://www.law.uchicago.edu/Lawecon/workingpapers.html
[200] The John M. Olin Center for Law, Economics, and Business, http://www.law.harvard.edu/programs/olin_center/papers
[201] Columbia Law School's Center for Law and Economic Studies, http://www.law.columbia.edu/center_program/law_economics/wp_listing_1
[202] The bepress Berkeley Law and Economics Working Papers, through the Olin Foundation Program in Law, Economics, and Institutions, http://www.bepress.com/blewp/default
[203] http://law.bepress.com/repository
[204] http://www.sba.gov/advo/research/wkpapers.html
[205] http://law.bepress.com/alea
[206] http://nts4.oec.uni-osnabrueck.de
[207] http://law.mscc.huji.ac.il/law1/mishpatvekalkala/prev.htm
[208] For example, Conglomerate: Business, Law, Economics, Society, a blog run by five law school professors, http://www.theconglomerate.org. In addition to regular posts, the blog hosts online symposia and an annual Junior Scholars Workshop, in which submitted papers (posted on SSRN) are chosen for discussion and feedback.
[209] http://www.lawprofessorblogs.com/

L6.4 Institutional support

Institutional support for the use of technology in law and economics consists almost entirely of access to previous research, e.g. published papers and working papers, through university law schools or through professional associations. Some government and university-sponsored websites (the latter often maintained by individual faculty) also provide access to raw datasets, as outlined previously. There are some other miscellaneous resources available, again maintained often by individual faculty such as computational methods useful to economic analysis[210] and compilations of links to useful information.[211]

[210] For example, the Society for Computational Economics, with information useful to those interested in computational modeling of economic and financial systems, http://comp-econ.org, and Agent-Based Computational Economics, a site devoted to disseminating a methodology for mapping economic systems, http://www.econ.iastate.edu/tesfatsi/ace.htm

[211] Such as FindLaw, http://lawecon.lp.findlaw.com, and The Information Economy, http://www2.sims.berkeley.edu/resources/infoecon/

APPENDIX D: NON-DISCIPLINARY CASE STUDIES

CASE STUDY: BUDGET COMMITTEE

BC1. Introduction

BC1.1 Background

For an overview of the University of California's academic advancement process and the specific role of the UCB Budget Committee,[212] see the white paper on academic advancement (appendix E).

We interviewed five knowledgeable faculty who had formerly served on the Budget Committee and were responsible for the selected disciplinary areas of interest. We also interviewed two campus-level senior administrators who receive and review Budget Committee recommendations in individual cases. To ensure that we did not violate the committee's confidences, the principal investigator sat in on these interviews.

BC1.2 Profile of interviewees

Senior faculty, typically, serve on the Budget Committee for a total of three years. It should be noted that two former members served on the committee in the late 1990s whereas three interviewees sat on the committee during 2001, 2002, and 2003. This difference of even a couple of years may have had an impact on responses given the recent emergence of new publishing models.

The academic divisions covered by interviewees who were prime reviewers during their service comprised the physical sciences, the social sciences, the humanities, and programs of the professional schools and colleges. The Budget Committee, as a whole, reviews approximately a thousand cases annually and interviewees reviewed about ten to fifteen percent of those as prime reviewers/first readers.

BC2. Publishing models; the needs of the discipline and how the publishing model fits these

BC2.1 Perceptions of traditional and non-traditional forms of communication and publication

Traditional forms of communication and publication

The traditional forms of communication and publication encountered by interviewees when serving on the Budget Committee comprised primarily peer reviewed journal articles (available in both an online and print format), books, invited lectures, and conference proceedings.

Interestingly, one former Budget Committee member commented that a challenge faced by the Budget Committee, prior to the advent of digital communication and publication, was how to evaluate non-traditional forms such as musical and dance performance; this was especially problematic for those members drawn from the sciences.

Non-traditional forms of communication and publication

Although three interviewees reported encountering non-conventional forms of communication and publication only occasionally (two of whom, it should be noted, served on the committee less recently),

[212] The portion of the UC Academic Personnel Manual giving the written criteria for advancement and promotion of faculty can be found at: http://www.ucop.edu/acadadv/acadpers/apm/apm-210.pdf Within that section, the passage on Research and Other Creative Activity is particularly pertinent.

two interviewees stated that by the early 2000s, alternative publication issues were surfacing. For instance, some faculty, having published electronically, did not have hard copies of articles to submit to the committee as part of their merit review. Moreover, by 2001 the examination of faculty websites as part of the review process was under discussion.

One interviewee believed that it was only a matter of time before scholarly works using new publication models would be presented to the Budget Committee because during his/her tenure:

> …it was clear that [preprint servers and electronic-only journals] were coming on the horizon, and I think a lot of people on the Budget Committee were interested in how we could accommodate those, both because they felt that it was an emergent form of publication and communication, but it was also something that could actually cut down on the bulk of materials that sort of migrated around campus and sometimes got lost…

Use of newer modes of communication and publication varies between and among academic divisions. One interviewee suggested that faculty in the sciences were more prone than their humanities and social science counterparts to make use of electronic publication because of the nature of their research (scientific results require rapid dissemination in terms of days and weeks rather than months and years) and, in part, as a reaction to high journal costs. In addition, former Budget Committee members perceived certain disciplines to be more likely to exploit new publication and communication venues, such as computer science, astronomy, statistics, the performing arts, and architecture, because of their innovative scholarly practice. According to one interviewee, senior faculty published in e-journals in an attempt to raise the profile of an emerging field or new journal.

BC2.2 The medium of publication

It was apparent in our interviews that the medium of publication was of utmost importance in terms of consideration and evaluation by the Budget Committee. In the physical sciences, the quality of the journal is paramount and more weight is given to prominent articles appearing in refereed journals.[213] In the social sciences, books and articles are weighted differently depending on the discipline, or even subfield, under examination. In the humanities, the form and standing of the academic press is most valued. For instance, how good is the university press? What is its list of published books like in a particular field? In addition, interviewees explained that the committee is interested in whether or not the author reached his/her target audience and, in doing so, if the medium of publication was well aligned to the specific audience.

One interviewee pointed out that part of the role of Budget Committee members is to educate other members, whose expertise falls outside the disciplinary area under consideration, about what the gold standard is in that particular field:

> A large part of the work of the different members of the Budget Committee was educating the other members of the Budget Committee about what was a premier publication…so we did…discuss that.

[213] For instance, *Science*, *Nature*, and *Proceedings of the National Academy of Sciences*.

BC2.3 Book-based fields

In book-based fields, former Budget Committee members who had evaluated tenure cases expressed concern over the decreasing number of traditional publication outlets available to academics.[214] Many university presses are not inclined to publish first books because they do not sell as well and, consequently, young, untenured scholars may have to venture to what are regarded as "second tier" presses. Such occurrences are rare at UC Berkeley, and interviewees suggested that, in such circumstances, it was often up to departmental administrators to argue the faculty's case on intellectual merit. Interviewees pointed out that it would be difficult to acquire tenure at a top-ranked research institution without a book contract.

The book is perceived as the "gold standard" in language and literature-based fields (with the possible exception of classics). One former Budget Committee member interviewed pointed out that the Modern Language Association's task force, examining the problem of scholarly publication, has recommended that the book should not be considered the one requirement for tenure. S/he expressed concern about this recommendation: "I don't think that the crisis in scholarly publication should lead us to lower standards, it should lead us to find other ways of allowing our faculty to meet those standards."

BC3. Peer review

Former Budget Committee members agreed that peer review is considered paramount in aiding the evaluation of scholarly work and in article publication cases in which peer review is absent, there was considerable discussion and concern among committee members. One interviewee outlined such a case in relation to the *Proceedings of the National Academy*:

> There's a vehicle for members of the National Academy to publish without review. And there were objections raised a number of times for people who, let's say, had a habit of publishing without review and these papers were very…controversial…peer review is greatly preferred for journal articles.

Another interviewee echoed the importance of peer review because it "is the mechanism by which the profession determines the quality of a candidate's work, so it's crucially important." Interviewees pointed out that, even in the field of law, where the editing of journals is carried out by students, independent peer review is seen as essential.

Correctly or not, interviewees often perceived newer forms of communication and publication with a lack of peer review. Former Budget Committee members voiced this concern, especially when evaluations were required outside of a reviewer's disciplinary area:

> Once you get out of your immediate field, where you don't know the universities, departments, or editors involved, people started to feel uncomfortable with new forms; in their own fields, they might know the scholars involved in an internet journal.
>
> Our evaluation of peer review and the value of a journal, and the importance of journals and so on…has to rely very heavily on what we learn from the chair and what we learn from the supporting letters, because we're not specialists in the field.

[214] An example given was the elimination of UC Press' Humanities list.

BC4. The advancement process and new publication methods: a support or hindrance?

Former Budget Committee members perceived the advancement process as neither supporting nor hindering new publication and communication venues. In fact, many interviewees considered the issue irrelevant and the reason for this is twofold: first, scholars on the Berkeley campus are reportedly not making use of new publication outlets, and, secondly, at the time when interviewees served on the Budget Committee, the issue was not discussed (although one interviewee speculated that in the last four to five years it is probably "on the radar").

Interviewees suggested that the advancement process should be supportive of non-conventional modes of communication and publication. Interviewees suggested that the Budget Committee could promote scholarly publication in society journals rather than non-traditional publishing venues. In addition, one interviewee believed that the committee should be unprejudiced toward scholars "exploring new things." Interviewees agreed that open-mindedness on the part of the Budget Committee should be encouraged; if and when alternative publication venues are accepted by intellectual leaders in the field as valid ones, they should be treated accordingly. Despite this, one former Budget Committee member pointed out that the Budget Committee and the dean merely "reflect" standards in each field. The role of the Budget Committee, s/he stated is not to "mandate what the appropriate outlets for publication are." Moreover, s/he suggested that the review process is very open: "the Budget Committee as a whole is very open to being educated and hearing about what the new trends are in…different fields, with respect to scholarly publication."

Interviewees provided two reasons to explain why the Budget Committee should support new publication models. One interviewee, although not an ardent supporter, was nonetheless concerned over the exorbitant prices charged to libraries for journal access. In addition, new forms of communication and publication were viewed as innovative: "there are a lot more interesting things one can do with these new kinds of publication."

None of the former Budget Committee members interviewed was aware of any recent or current changes to the faculty rewards systems to accommodate newer communication and publication forms.

BC5. Institutional support of faculty scholarly practice and publication experimentation

Although former Budget Committee members perceived that there is institutional support in terms of innovation in undergraduate teaching, there was allegedly very little support for experimentation of scholarly practice and publication: "there doesn't seem to me [that] there's any effort at educating junior faculty about possibilities, nor is there any high level, or even mid-level, ongoing conversation about the problem."

One interviewee suggested that administrators, especially the Provost, could make certain recommendations since they are in a good position to "get a conversation going." Another interviewee suggested that the Office of the Vice Chancellor for Research could play a supportive role in faculty experimentation with newer communication and publication venues.

One former Budget Committee member argued that the role of the administration (encompassing deans, chairs, and provosts) is minimal in terms of influencing the Budget Committee because the latter is a relatively conservative body that will take time to change, although s/he acknowledged that much is dependent on the composition of the Budget Committee in question and how it views its role. Moreover, interviewees mentioned that standards vary from Budget Committee to Budget Committee over time; while some may be more generous in their merit reviews, others may be more conservative. One interviewee claimed that often faculty perceived Budget Committee members as "narrow-minded"

individuals who "are always judgmental" and "if you don't publish in exactly the right way then you can't possibly get a fair shake." S/he believed that such a perception is unwarranted.

A test case of interest, described by one former Budget Committee member, illustrates an academic career characterized by innovation:

> There's a very distinguished colleague who [has] sort of plunged into electronic publishing, and, in particular, [is] trying to prevent publishers like Elsevier and so on from…trying to drive them out of the market, to some extent, by having electronic journals…with editorial boards of scholars, who…have agreed to do that and don't expect any money.

According to the interviewee, it will be interesting to see whether or not the efforts of this individual are rewarded by the Budget Committee.

In attempting to draw comparisons between UC Berkeley and other institutions on issues of non-traditional communication and publication outlets, interviewees reiterated that, since the issue did not arise while they were serving on the committee, it is difficult to comment. One interviewee, however, suggested that UC Berkeley is in much the same position as other national major research universities facing "the publishing crunch."

Former Budget Committee members believed that although the actual review process conducted by the committee has remained constant over the past ten years, there are other ways in which the Budget Committee is subject to change. For instance, interviewees reported that in recent years there has been more weight given to teaching and service, culminating in a more balanced evaluation between research, teaching, and service. Moreover, interviewees expressed concern about the Budget Committee's having immediate and efficient online access to a scholar's research. Identified changes in the review process were, however, not perceived as related to scholarly communication.

One interviewee perceived the manner in which the Budget Committee operates as a function of the committee's chair and his or her leadership skills. In his/her experience, the chairs tend to be somewhat conservative:

> The Budget Committee is like all organizations. It's an interplay of personalities that plays a role, and how the chair sets the tone matters. To what extent the chair insists on his or her own views, even though the members have gone one way.

BC6. <u>The reward system and publishing practices: advice</u>

Two former members of the Budget Committee stated that they were great believers in the current reward system and one stated:

> I think this is a good system where we maintain objectivity to a high degree. So I would encourage the enforcement of the highest academic standards, and I think the current system does pretty well.

On interviewee postulated that the committee is aware of problems related to scholarly communication but, rather than proposing a solution over which it had no real authority, it was waiting to see how different academic fields respond.

Other interviewees suggested a number of possible changes to the current rewards system and to newer means of publication so that they mesh better. First, interviewees suggested that scholars should be able to submit their websites as part of their research profile (although in the absence of a website, scholars should not be discriminated against). Second, articles deposited by scholars to an archive could be

circulated to external colleagues and the Budget Committee might ask that opinions on these specific papers be sought by department chairs in letters to external referees. Finally, and perhaps most importantly, there should be specific guidelines for department-level reviewers making the case for colleagues who employ non-conventional means of publication and communication. One former Budget Committee member who is in the position now of preparing a case for a departmental colleague asks:

> how do I frame this for someone who is very accomplished, [has an] international profile, [has spent] a lot of time putting things together for a major website…that's accessed by people all over the world, so s/he's reaching an audience far greater than s/he would if s/he'd published even in a topnotch journal? So how to evaluate the potential audience…that the work is going to have is…one of the kinds of questions that needs to be addressed.

The interviewee highlighted the serious ramifications of this scenario. At the departmental level, the chair and dean reviewing the case may be conservative in their view of what constitutes "valid scholarly communication." This, in turn, may influence the way in which a case is presented to the Budget Committee, and, consequently, it may receive negative reception.

CASE STUDY: LIBRARIANS

L1. Introduction

L1.1 Background - changes in the library

Librarians discussed library technologies and how changes to these technologies affect daily operations. One librarian reported that the majority of his/her time is now spent licensing, managing, and promoting electronic resources, a significant change from the days of the card catalog. Similarly, another interviewee mentioned how easy it is now to find resources in online catalogs. As a result, the reference desk is not used to the same extent, and librarians spend their time providing classes for students on resource use. Some librarians also noted that faculty rarely come to the library any more; rather, they do their research online.

L1.2 Profile of interviewees

The five librarians we interviewed had worked at UC Berkeley between seventeen and thirty-seven years and had been in their current positions for between six and nineteen years. We attempted to recruit librarians with expertise in the five disciplines represented in the disciplinary case studies, although in some instances, the representative librarians had only some general knowledge of specific disciplines. In addition, we have included the opinions and experience of two of the project's steering committee members with general expertise in library issues.

L2. Publishing models; the needs of the discipline and how the publishing model fits these

L2.1 Perceptions of traditional and non-traditional forms of communication and publication

Traditional Forms of Communication and Publication

Librarians mentioned all the basic forms of conventional communication and publication discussed by faculty including journals, monographs, books, working papers, conference proceedings, critical editions, and textbooks, although the degree to which each is used varies by discipline (as noted in the disciplinary case studies).[215]

Newer Forms of Communication and Publication

Librarians identified non-traditional communication and publication vehicles such as preprint and postprint servers, electronic-only journals, and websites.[216] One librarian explained that the move toward newer models was a slow, evolutionary process rather than a sudden shift. One librarian and one steering committee member simply thought of print and e-journals as the same entity, possibly because the journals most frequently accessed online are often electronic versions of print journals. Librarians explained that the UC Berkeley Library belongs to various national groups aimed at informing librarians and educating users regarding the general issues surrounding newer means of communication. Three

[215] We also know that types and modes of publications used by faculty often vary greatly even within subfields of any given discipline.

[216] A number of specific projects were also mentioned, including the California Digital Library, bepress, AnthroSource, SPARC (an initiative of the Association Research Libraries to start electronic journals), databases collecting protein and genomic sequences, the Forum in Political Science, Business and Politics, the Public Library of Science, Project Muse at Johns Hopkins, JStor, and Faculty of 1,000, a website for peer evaluation of papers.

interviewees had not taken part in any specific initiatives around these issues. One interviewee, however, had participated in and advised on a number of boards related to new models of scholarly communication and publishing. Furthermore, another librarian talked about the digitization of UC Press publications (books and monographs) in anthropology over the last century, a project which was just getting underway at the time of the interview. This type of consolidation is important because having a large amount of background material available online gives legs to newer projects, as one librarian explained, "[putting up material piecemeal is] the way a lot of these things are showing up, is like one or two issues and you can search within it, and that's all very nice, but there's not enough stuff."

Librarians regarded the move to newer, electronic forms of communication and publication as a positive development. For example, one librarian discussed why anthropology, in particular, is a good venue in which to invest in experimentation with newer forms of communication and publication:

> One might argue that if you figure out anthropology, you've figured it [all] out, because it has all the range…from the humanities to the hard sciences…if you can figure it out in anthropology… then you have the small-scale version of what needs to happen on a larger scale.

Another librarian explained how topical websites complement the larger scholarly trend of interdisciplinary work:

> You can't just pigeonhole [scholarly work in English] into literature but you're going into history and philosophy and economics, and some of those sites are very, very interdisciplinary, and serve as just marvelous entrees into that sort of multi-disciplinary research.

Open access and author-pays models. Librarians had varying responses to open access and author-pays publishing models. Often their views reflected the fact that these models are in the very early stages of development and that few faculty use them. Several librarians were hopeful that these newer modes of publication, whatever their drawbacks, might represent an alternative to unsustainable journal costs. One librarian mentioned that new modes of publication have, in some cases, generated competition to the extent that commercial publishers are forced to reconsider their prices. Nonetheless, two interviewees voiced concern about whether such ventures would prove economically sustainable. One librarian in particular surmised that these models might need a large nexus of institutions financially contributing to their startup.

Librarians mentioned a number of drawbacks to such models, including the current inability to evaluate open access publications. Currently, there is no equivalent to the impact factor though appropriate technologies are emerging.[217] Two interviewees expressed concern about the potential monetary harm to the library should author-pays fees become a library expense. Other considerations were more discipline-specific. One interviewee thought that open access models might threaten the strength of scholarly societies. In chemical engineering, for instance, since journal profits are often returned back into the society, this could arguably be a reason why the model has not made many inroads. Instead, the emphasis has been on shifting to less expensive commercial publishing. One librarian thought that open access models might be viable only for well-funded disciplines, noting that "author-pays" is a misnomer since it should be the organizations funding the research that pay for publication, not the author. Another librarian similarly suggested that there has been resistance to author-pays models in anthropology due to limited grant funding, although institutional funding could be a solution.

[217] For example, one steering committee member explains that there is new technology that allows the scholarly materials on the Web to be bookmarked, in which individuals can make comments and then expose those bookmarks which, in a sense, is similar to peer review and anonymous. If this method were to gain popularity, data could be generated about open-access publications (showing that they are well used and highly cited).

L3. Print versions of journals

L3.1 Need for storage

There is currently a need to store large amounts of library material because libraries are simply running out of space. The advent of electronic repositories has changed the way in which libraries can store scholarly materials. For example, as an experiment, literature titles available through Project Muse were stored and there were rarely any requests for the stored items since faculty and students primarily use the online versions. Similarly, another librarian reported that s/he was never required to retrieve a stored journal because of faculty complaints about its inaccessibility.[218]

Though in the past libraries have rarely discarded anything aside from occasional duplicates, a change may be on the horizon for the entire University of California system. As one librarian noted, "with these new electronic models like JStor…does every campus need to keep complete sets of all these huge back runs?" A new project just launched will determine which campuses have which volumes, then bring these together into a single archived collection, discarding all duplicates.

L3.2 Cancellation of print

Canceling print versions of journals has become increasingly common, and even necessary, due to the high cost of maintaining both print and electronic versions. On the whole, faculty have not had any problem with this policy as the library maintains electronic access to many of those publications.[219]

In fact, the cancellation of print versions altogether is beginning to be orchestrated on a UC-wide basis. The CDL has tested this procedure by storing one pristine print copy of all new Elsevier journals at UCLA's regional library facility, thereby enabling all campuses to cancel their print subscriptions. Although this policy made it easier for faculty to accept the cancellations, it has been expensive and may not be pursued with other publishers.[220]

L3.3 Working with faculty

Librarians solicit faculty feedback to determine which journals they should store, which journals they should cancel, and when to cancel only print versions. Typically, the subject librarian creates a list of the titles in question and asks for faculty feedback, though they also seek out specific faculty members for input. Occasionally, faculty feedback results in removing a journal from the cancellation list, but UC Berkeley has a good inter-library loan (ILL) service that can provide faculty with access to most publications. In addition, UC librarians work with each other across campuses on issues of storing and discarding journals.

[218] Librarians select very carefully what is to be stored by tracking journal use. When librarians are unsure about what to store, they ask relevant faculty members, though librarians tend to have a good sense of what to store. Consequently, one librarian mentioned that s/he has never had to bring back a stored journal because of people being upset.

[219] One librarian sent out lists to faculty proposing cancellation of over 2,000 print versions of journals, and only kept fifteen or twenty titles due to strong faculty opinions.

[220] Another librarian also mentioned that there have been some tensions between campuses around issues of ownership of material, particularly regarding unique items.

L3.4 Persistence of access

Now that much of the research literature is being accessed electronically, persistent access has become an issue. When libraries buy print products, they own them forever. In online models, they are leasing the information and, as such, do not have the same level of control. Consequently, disappearing information and annual upkeep charges have become problematic. To deal with this issue, librarians try to negotiate licensing models that guarantee perpetual access, necessary for instance if a publisher were to disappear. Often this comes in the form of an archival CD-ROM or a mirror site, which raises a related problem associated with changing data formats.

L4. Advantages and disadvantages of newer forms of communication and publication

There are a number of ways in which librarians believe that non-traditional modes create both opportunities and difficulties for scholarly communication and publication. Almost all of these examples were framed in terms of the consumption, rather than the production, of scholarly material.

Librarians cited advantages such as greater ease, convenience, and efficiency in searching and accessing scholarly material; lower costs; increased speed of dissemination; and the ability to have hyperlinks in articles to things like molecular models, videos, and cited articles.

Interviewees also identified disadvantages including the need to learn new methods of searching; faculty's inability to keep up with available resources as a result of lack of time; and students' and even some faculty's, heavy reliance on Google and Yahoo. Additionally, librarians pointed out the "version" problem, both in determining which version of an article should appear in repositories and postprint servers, and for users in determining which version of an article they are reading.[221]

L5. Crisis in scholarly communication

L5.1 Nature of the crisis

Librarians agreed that there is a crisis in scholarly communication that is centered on the issue of rising costs of scholarly materials, which is resulting, or will result, in a great number of cancellations of both journals and monographs.[222] As highlighted by one interviewee, traditional models are no longer sustainable. The consensus among librarians was that journals are too expensive for libraries whose budgets have been flat since the early 1990s. As one interviewee noted, "librarians have reached the limit of juggling and stretching." Librarians perceived the increasing number of niche journals as part of the problem. Similarly, one problem with monograph publication is that presses have become increasingly discriminating (especially seeking highly marketable work), thus forcing faculty to publish in less prestigious presses.

[221] For example, one librarian stated, "what version of your paper can you deposit to it? You know, can it be the final edited one with the peer review comments, or does it have to be the…the penultimate one before it goes to publication?" On the user side, another librarian said, "Well, they certainly provide a more ready access to the stuff that's actually there. But then there's a version problem, you know… which version am I looking at here?"

[222] One librarian also raised the concern that such cancellations could ultimately lead to journals being discontinued by publishers, in which case no one wins.

Librarians criticized publishers; increasing conglomeration was viewed as particularly problematic by some. One librarian noted that publishers have long seen libraries as "cash cows." Other interviewees talked about the larger philosophical problem behind the current crisis, namely that the university pays twice for the same work:

> We were paying to support [faculty] here, in their labs and offices… and then we were paying to buy the journals that they were publishing in.
>
> [the university is] paying them [faculty] salaries… and then they [faculty] give their product over to an international publisher, who then charges us.

One librarian stated that, because faculty give away copyright to publishers and the library can no longer afford to buy the work back, the university has "lost control over the intellectual output of our scholars, and we're making companies like Elsevier very rich in the process."

L5.2 Faculty awareness of the crisis

Librarians seemed to think that faculty do perceive a crisis in scholarly communication to some extent. For instance, librarians believed that faculty are aware of the exorbitant costs of many journals, although they do not know the actual journal prices that the library pays. Some librarians suggested that UC Berkeley faculty are insulated to a certain degree because access to journals has been unaffected. [223] It may be that faculty become more aware of the crisis only when it leads to an inability to publish their own work, although this is not a problem at prestigious universities like UC Berkeley. One steering committee member also found it difficult to imagine the price of publication being a driver for change in the academic reward system.

Faculty who are editors for societies like the American Chemical Society are more sensitive to issues of cost because of the efforts of these associations and, as such, faculty are proud to be associated with non-profit publishers. One librarian said that faculty have been educated and have become somewhat more willing to try new models like bepress, eScholarship, and AnthroSource. Another librarian expressed the hope that once faculty clearly understand the situation, many will become willing to try new models.

L5.3 Education of faculty

Librarians educate faculty and administration on library issues by sending emails or online newsletters about new resources, cancellations, and the prices of journals. Librarians ensure that access is available to the electronic version of the journal to which the library subscribes. They maintain search tools that provide direct links to articles (for instance, UC E-links) and inform faculty and graduate students, via online newsletters or email, about new journals and new electronic resources.

Librarians have the option of attending faculty fora (colloquia, conferences, etc.) to stay abreast of the field and ensure that library collections are well aligned to the latest developments. One librarian noted that s/he also talks about library costs at departmental meetings, and that the library has a website documenting all prices.

[223] This access is achieved largely through the efforts of the CDL to get system-wide licenses to large journal packages.

Some librarians mentioned that education of faculty was key in addressing the scholarly communication crisis.[224] Getting faculty involved does appear to yield results, and one librarian explained that, after partnering with faculty, the library was able to negotiate a price control agreement with Elsevier.

Interviewees mentioned that educating faculty about copyright issues was important. One librarian believed that it was a librarian's responsibility not only to encourage faculty to retain copyright and publish in less expensive journals, but to advise faculty to take a proactive stance in managing copyright.[225] In practice, however, faculty are often unsure of whether they can post their work online, e.g., on their own website, once that work has been published.[226]

L6. Librarians' perceptions of faculty use of new publication models

L6.1 Overview of activity

The consensus among the librarians whom we interviewed was that faculty are using new forms of communication and publication, *albeit* in limited ways. Use of preprint servers, for example, was reported as rare.[227] Librarians overall perceived that faculty in the sciences are more likely to publish important work in journals that also have online versions, while faculty in English-language literature tend to rely on more traditional publication venues. Although librarians perceived the humanities as slow in adopting new models, they noted that the MLA recognized early on the usefulness of the electronic arena for preservation of journals. Librarians agreed that the main use of newer forms among faculty is primarily informal: using email, Listservs, and blogs to ask questions about techniques, try out ideas, or form or join communities. As such, they perceived faculty primarily as consumers not producers of newer forms of publication and communication, and as one librarian explains:

> I think that [faculty] would go for electronic only [publications] if they thought it was a prestigious journal that would be around some time, that it would be archived…but they have no problems with electronic [versions] of established print [publications], and I think that's pretty amazing that I could give up so much print, and I don't think that they would be worried.

One steering committee member agreed, estimating that about five percent of faculty are using new forms such as postprint repositories.

L6.2 Importance of tenure and the role of the institution

Librarians perceived tenure and advancement as a main consideration in faculty's lack of use of newer means of publication: "it's not clear how these new models will be evaluated and recognized in the review system." One librarian suggested that although tenure consideration is a driving force for junior faculty, even once faculty have tenure, they are not willing to give up the prestige associated with

[224] One librarian said, "We need to make it clear to them what the benefits are for open-access publishing, because they understand very well the benefits for publishing in the best journals in their field… getting jobs, getting grant proposals… getting tenure… those things are very, very tangible to them, but I think in some cases the benefits of open-access publishing… are slightly more altruistic, although it could also benefit them; having the world being able to access your research… might mean that it's disseminated more widely and used more readily."

[225] One librarian is a proponent of open-access under the Creative Commons license.

[226] Publishers' author agreements vary widely; faculty may or may not be allowed to post work to their own websites, institutional repositories, disciplinary repositories, etc.

[227] One librarian reported that faculty would like to use preprint servers, but that it is too confusing because of the variation in publishers' author agreements (see footnote 147). Another librarian, in contrast, said that faculty in the biological sciences do not use preprint servers because there is so much competition between labs that they want to publish in an official journal to make sure they get credit for the work.

publishing in conventional publication outlets. Another, however, has worked with some faculty who have become more willing to experiment once they achieved tenure.

Librarians had some suggestions for ways to encourage faculty use of new means of publication, many of which centered around the tenure system. One interviewee suggested that faculty be rewarded for sitting on the editorial boards of online journals. Another postulated that UC Berkeley could require all research to be available in an institutional archive, or be open access, for it to be considered for tenure. Librarians perceived that any substantial changes in the reward system, as well as attempts to educate faculty, must originate from the Academic Senate.

Although one interviewee suggested that changes made at Berkeley could potentially lead to national changes (because of the close attention Berkeley receives from other institutions), another interviewee emphasized that Berkeley alone cannot change the world. There are, however, attempts by librarians[228] to work together within the UC Consortium as well as with other consortiums nationwide.

L6.3 Importance of age

Librarians did not agree on whether age affects faculty use of newer means of publication. Two librarians thought that age was important; one mentioned that senior faculty might not be as attuned to newer models, whereas younger faculty might be more open to them, as well as more comfortable using online resources in general. Another librarian also believed that faculty use varied by age, predicting that younger people would be unconcerned about whether a journal exists in a print format. In contrast, two librarians did not think age was important. One believed that while younger people "grew up with this technology and they want to use it," some senior academics are also very "techno-aware." Another noted that tenured faculty are often more willing to experiment, possibly because of a lower risk of jeopardizing advancement, but that often junior faculty are interested in shaping new means of publication, because they believe "this is how it's going to be."

L6.4 Other considerations

Librarians discussed a number of other considerations affecting faculty use of newer models of communication and publication. Librarians perceived that obstacles for faculty include the current lack of outlets in the humanities[229], the perceived lack of quality or prestige of online journals, the perceived lack of peer review, and the possibility of having to pay to publish one's work. Librarians believed that faculty incentives might include easy access to and greater distribution of published articles as well as the popularity of online resources among students.

[228] For instance, one librarian stated that they work alongside the Scholarly Communication Officers Group and the UC Scholarly Communication Program Priorities.
[229] One librarian said that there are some online journals, but they have not been a big hit.

APPENDIX E

WHITE PAPERS

Scholarly Publication Issues Pertaining to the UC Academic Advancement Process

C. Judson King, UC Berkeley
July 15, 2005

The academic advancement process for faculty at the University of California is uniquely systematic and well documented.[230] It thereby affords a good opportunity for examination of the values that are applied at various levels of review and for different disciplines. More specifically, it affords an opportunity to examine the way in which perceptions of the academic advancement process influence faculty decisions with regard to scholarly communication and publication venues.

There are several issues at play here. One, of course, is to identify the particular perceptions, values and criteria that influence decisions of faculty members in picking actual vehicles for publication or other scholarly communication. Another is to identify the ways in which general perceptions of conventional print vs. electronic submission, peer review, journal status, immediacy of publication, breadth or specificity of audience influence these perceptions and decisions. Still another issue is establishing the extent to which the perceptions of individual faculty members related to the importance of different means of publication in the academic advancement process may differ from the perceptions and policy-related statements of reviewers at various levels.

Complicating the situation, despite the systematic nature of the review process, is the question of to what extent the actual criteria influencing the discussion are, in fact, documented. Value judgments as to the nature of the publication venue may be couched in a broader statement. As well, the report from an *ad hoc* committee or the minute from the Committee on Academic Personnel or Budget Committee is a unitary report and thereby does not reflect all views expressed during review and discussion.

At the earlier stages, the advancement review process reflects the value system of the particular discipline of the faculty member. However, the CAP or Budget Committee is composed of members from a wide variety of academic disciplines, with the actual mix changing over time. Thus, at that level of review, the differing value systems across the disciplines are all present and are melded to some degree. For this reason, among others, the actual criteria being applied may change from one level of review to another.

Another, somewhat different, issue has to do with the relationship of the advancement review system to peer-reviewed, and hence selective, institutional repositories of scholarly publications from its faculty. A faculty member has a right to impartial treatment by the institution and hence the same opportunities for

[230] Faculty salaries are coordinated with a formal series of steps within rank, with specified "normal" periods of time at a step. Advancement reviews for faculty members typically occur every two or three years, with a review being mandatory after five years. A review begins with the faculty member providing a dossier of activities and accomplishments since the last review to the department chair, who analyzes the material, consults the rest of the department at that rank or above formally, and writes a "case" analyzing the faculty member's accomplishments and recommending a specific advancement action. The Dean then receives and comments in writing on the chair's analysis and recommendation. The packet then goes to the Academic Senate Committee on Academic Personnel (CAP -- Committee on Budget and Interdepartmental Relations at Berkeley), where it is analyzed in depth. That committee then provides a "minute" to the administration summarizing its analysis and recommendation. The administration then takes the final action. Tradition has it that the administration will agree with the Senate recommendation in the overwhelming majority of cases. For promotion between ranks, letters of evaluation from peers outside the university are solicited (typically as many as eight), and a confidential *ad hoc* committee of faculty (two from outside the department, one from inside) is appointed jointly by the Senate and the administration to analyze the case and provide a written report informing the review process before review by the Senate committee. External letters are also used at certain other key step advancements, e.g., Step VI of full Professor.

advancement that any other faculty member has. Can one and the same institution properly make the selective judgment with regard to publication and carry out the review process for advancement, when a value judgment associated with acceptance for the repository will be a component of the advancement review? This potential complication can probably be lessened by having the editorial judgments made by persons not involved in the advancement review process and/or by moving toward multi-institutional peer-reviewed repositories.

On the other hand, electronic publication and institutional repositories can tie in with the academic advancement process in positive and synergistic ways. There can be facile access by reviewers to the publications of a faculty member. If a repository is used as the source of papers to be considered in the review process, this will provide a strong incentive for faculty members to place their papers in repositories.

Structuring and Budgeting for Scholarly Communication within the University
[Example is the University of California]

C. Judson King, UC Berkeley
July 15, 2005

Large-scale adoption of open access repositories, author-pays or other related newer types of scholarly publication may create significant overall budgetary savings for universities but will require major internal shifts in budgeting that can be complicated and challenging to achieve.

Current Costs and Budgeting. Current budgeting is dominated by very large costs for journal subscriptions and book purchases, be they in print or electronic forms. Within UC, these costs are covered by budgeting from each campus to its library. There is also some direct budgeting to the California Digital Library for purchases. Significant economies have been achieved in recent years through

- system-wide subscriptions and licensing
- pooling of funds among campuses for purchases and subscriptions
- instituting a rapid delivery system for movement of library materials among campuses in response to requests
- cancellation of print subscriptions to journals that are available in electronic form
- removal of print versions of back issues of journals for which back issues are reliably available in electronic form, keeping one archival copy for the system in a storage facility, and
- shared-use regional storage facilities.

These economies have been more than offset by increases in journal and book prices and other needs that exceed the general level of inflation. There are smaller, but significant, budget needs for moving materials among campuses and operation of regional storage facilities. The university is at, or very close to, the point in time when it will not be necessary to build additional storage space for print library collections, and one can look to the day when it will be feasible to reclaim space from library storage facilities for conversion to other uses.

An additional cost is page charges paid to those journals that still require them. These are drawn by individual faculty members from extramural grants. The practice of page charges is declining, however, and primarily (exclusively?) occurs within the natural sciences.

Current Income to the University and Individual Faculty Members. Faculty editors for private journals and for some society journals are often paid directly by commercial publishers. This is frequently accomplished as a buyout of faculty time (released time), thereby freeing funds for replacement teaching services.

Additional Factors: University faculty members contribute, *gratis*, their time for the peer review process that is essential for maintaining journal quality and status. As well, faculty on the Academic Senate's UC Press Editorial Committee contribute their time.

Budget Needs for Various Open Access, Peer-Reviewed Models:

All the following cases are considered with the assumption that peer review is done essentially as it is now in refereed journals, and that UC institutional involvement would be at the system-wide level, so as

to gain financial efficiency, leverage and consistency. The main budgetary shift would then be from campus library purchase budgets to the system level, potentially a controversial shift.

1. Publication by Independent, Open Access Publishers (e.g., PLoS) with an Author-Pays Model. The University will have to fund authors who do not have grant funds for this purpose and will have to face the issue of whether to call upon grant-funded authors to pay their own publication fees even though other authors are subsidized by the university.

If some or all of UC Press activities are to be open access, UC will need to choose between the author-pays model and a direct subsidy of the Press (see #2 below. Authors will probably prefer the former, while the UC Press will probably prefer the latter.

2. University Directly Supports Independent Open Access Publishers (e.g., PLoS), thereby Gaining Publication Rights for Its Authors. In this case the university will have to send substantial funds to the publisher. Another issue arises if the university-funded publisher declines a paper which the faculty author must then pay to have published elsewhere.

3. University Promotes and Facilitates Formation of Open Access Journals, and Faculty Become Editors. This probably requires paid, released time for faculty editors, along with staffing, space and expense budgets. It may be possible to gain some efficiency through the provision of university-funded support services that serve multiple, or all, such journals, e.g., an on-site publishing office. Such publication initiatives might be done best through a UC-owned subsidiary, or one that is joint between UC and an established publisher.

4. University Has Its Own-Open Access, Peer-Reviewed Repository. Funding is needed for support services for overseeing and managing the repository, acquisition of editors and reviewers for peer review, as well as other services.

5. University Joins Consortium of Universities Doing #3 or #4. This could overcome the issue of denying publication for a university's own faculty.

For all of these mechanisms there is the question of whether the savings in the library subscriptions and purchases budget will offset, or hopefully more than offset, the new costs involved.

There is also the question of the costs of the period of transition from the old to the new that probably calls for larger expenses during the transition, so as to start the new and keep both the new and the old going.

What is the role of the university press in the rapidly changing climate of scholarly publishing?

Lynne Withey, UC Press
September 2005

The context:

- The high cost of commercial journals is forcing changes in the way scientific scholarship is published.
- Declining sales of monographs—driven partly but not entirely by the increasing proportion of library budgets devoted to journals—are forcing presses to publish many fewer specialized monographs. This reduction is particularly serious in the humanities.
- Digital technologies are changing the way journals and (to a lesser extent) books are distributed. Teaching methods and materials are also changing (e.g., classroom websites, e-reserves).
- Universities are moving to assert more control over publishing, for example, by encouraging faculty to retain copyright in their work and creating institutional repositories for faculty research.

The current situation of university presses:

- Presses are primarily book publishers; relatively few publish journals; even fewer publish STM journals. University-press published journals are a small fraction of the total, whereas university-press published scholarly monographs are a very high proportion of the total.
- Presses are largely independently funded, a consequence of growth in university enrollments and faculties in the 1960s that allowed presses to make money on scholarly publishing and encouraged university administrations to withdraw subsidies.
- Presses are organized and operated on a model similar to commercial book publishers. This trend has increased as presses are forced to make publishing decisions based on financial considerations as well as scholarly merit.
- Presses' business organization and their need to maintain financial independence tends to put them on a collision course with other institutional interests—notably the movement toward open access and faculty concern about maintaining sufficient opportunities for publishing specialized monographs.

University presses' roles under the traditional model of scholarly publishing:

- In book publishing, presses develop editorial programs, acquire content, and take on all the financial risks of publication, including manufacturing, marketing, and distribution. Presses act as the gatekeepers. There are at least three levels to this gatekeeping role: first, the press's strategic decisions about which fields to emphasize; second, the decisions made by individual editors in shaping their programs and deciding which manuscripts to consider seriously for publication; and finally, peer review by outside experts. For those manuscripts accepted, presses provide the full range of publishing services—editorial development, including copyediting; design and production; marketing, sales, and distribution.
- In journals publishing, presses usually act as service providers on behalf of other agencies (most commonly scholarly societies), although in some cases presses initiate journals and own the content in a manner similar to the situation with books. For journals published on behalf of clients, presses provide a range of services, including copyediting, print production and distribution, digital production and distribution, marketing, and business services such as subscription management. The specific services will vary according to the particular client's needs.

What might the future look like:

- A larger role for university presses in publishing journals by 1) taking over journals currently published by commercial presses; and 2) providing publishing services for journals launched by faculty as alternatives to commercial journals.
- Changing the way specialized monographs are published by 1) publishing in digital format with a print on demand option; and 2) adopting an editorial model similar to that used in journals publishing, in which acquisition of content and peer review are managed by faculty editorial boards.
- Continuing to promote the broader dissemination of scholarship by publishing books based on faculty scholarship with the capacity to reach audiences beyond the university. It is important to recognize that this kind of publishing is an important part of university outreach, not simply a means of maintaining presses' financial stability.
- Collaboration among faculty, libraries, and presses to make best use of each entity's strengths, leverage work that is already being done, and use the university's financial resources most efficiently. For example, in the UC context, the CDL has a sophisticated technical infrastructure that does not need to be duplicated. UC Press has a digital hosting platform for journals, contracts in place with print vendors, and a sales and distribution system for both books and journals. Several series managed by faculty editorial boards are already in place, using the CDL's eScholarship repository for digital publication and UC Press's printing and marketing services.
- Re-think how university resources for scholarly publishing are distributed. Look at total costs, sources of costs, and distribution of funds; evaluate how funds should be distributed to various cost centers.

Issues to consider in implementing these scenarios:

Changing the publishing system for journals, especially STM journals, presents several challenges. Most commercially published journals are owned by their publishers and cannot easily be moved to university presses or other nonprofit publishers. Journals published by scholarly societies present an easier case, in theory, but societies depend on journal subscriptions for a significant part of their revenues and are therefore attracted by the greater financial incentives offered by commercial publishers, no matter how much they may believe in nonprofit publishing. As a result, university presses face stiff competition from commercial publishers in acquiring and retaining journals.

New, mostly open access journals are an important alternative, but their sustainability is open to question. Some of these journals, especially small startups, could benefit from the services of university presses. However, under presses' current business structure, it is usually not possible for them to take on open access journals.

In the case of specialized monographs, adopting the model described above—the journals editorial system plus digital-first publication—could reduce costs significantly. But it also involves shifting some costs from presses to libraries (for the technology services) and to faculty (for editorial selection and peer review). This shift may require either additional funding or reallocation of existing funds devoted to publishing.

In addition, and perhaps most challenging, the move from traditional print publication to a digital + print system requires a cultural change among authors who remain wedded to print. (This is especially common in the humanities.) Many faculty are concerned about whether digital publication will be viewed as less prestigious and therefore less significant in determining tenure and promotion. This concern is gradually diminishing, but there is still the larger issue of resistance to non-traditional publication. For example, authors typically want customized design and marketing—costs that are not justified by the level of demand for very specialized scholarship.

To return to the question of university presses' roles in the changing world of scholarly publishing, there is a need to move away from the book/journal and print/digital dichotomies, toward a focus on content that may be published in a variety of formats for a range of different audiences. Presses need to position themselves as service providers with a broad array of services that can be tailored to meet specific needs. This shift in focus is most easily accomplished in journals publishing, where presses are already accustomed to characterizing themselves as service providers and where digital publishing has advanced significantly. The biggest challenge for journals publishers now is how to adapt business models to accommodate the move toward open access.

Book publishing has been slower to change thus far. Most university presses are wedded to the notion that the initial acquisition of content is part of their fundamental gate-keeping role. If this function changes for some portion of a press's editorial program, what then is the press's contribution? Presses' editorial capacity is best used in selecting those books that have a significant non-specialist audience, where professional editors' judgment is most critical. For specialized monographs, as for journals, faculty in the appropriate fields are the best judges of content. However, if faculty members select content and manage peer review, this raises the issue of broader quality control. There is some danger that a system in which scholars in a given field make all the major decisions about what gets published in that field can become too narrowly focused. Publishers provide a broader perspective. One way to maintain this perspective in a system that relies more heavily on faculty editorial boards is to ask presses and faculty to collaborate on the scope and size of editorial series and to have presses to retain overall management of peer review through their editorial boards.

Thoughts on a journalism blog

Tom Goldstein, UC Berkeley
January 3, 2006

Jud King asked me to write a short "white paper" about the "use and potential uses of blogs in the communication of research results, emphasizing journalism."

My answer to that question is short. I have been unable to identify such a blog that relates to journalism research. So I will write about something else, which I hope is useful.

I will focus on how a single individual named Jim Romenesko, working either from his one-room apartment, the public library or a corner Starbucks in Evanston, Ill. has transformed the practice of journalism in the last half decade.

His is surely the most bookmarked site <http://www.poynter.org/column.asp?id=45> among journalists and journalism professors. They read his selection of stories from other outlets about reportorial transgressions and business changes in addition to profiles of journalists and commentaries on media issues. Romenesko does a remarkable job combing the press for stories about the press, relying primarily on a couple of dozen sources, including Page Six of the New York Post (which for some years has actually been on page eight) and various gossip columns of the New York Daily News. Most often, these items are not independently verified. He merely reports what others are saying and leaves it at that.

Like a wire service reporter, he does not reveal his prejudices or biases in offering what he calls "your daily fix of media industry news, commentary, and memos."

There is no obvious political agenda, as in TimesWatch.org, a spin off of Brent Bozell III's conservative website.

But selection is necessarily at work. Not every story about the media is printed; Romenesko chooses which ones do appear. And he does place his own headlines (sometimes witty, often not) atop the stories and does write his own short commentary to most items. Understandably, his site is skewed toward print, though he pays attention to NPR and to a lesser extent the big issues relating to television.

In linking up a finite universe of journalists, Romenesko exerts an extraordinary influence—an influence far beyond what was imaginable when he started out.

In 1996, Romenesko took a job as an internet columnist for the St. Paul Pioneers Press. Two years later, he started his own Web site, the Obscure Store & Reading Room, which focused on his quirky fascination with offbeat news and media stories.

A year later, in May 1999, the media section of the site broke off as Mediagossip.com. After an initial burst of popularity, Poynter Institute, a well-endowed, non-profit journalism training center in St. Petersburg, Fl., hired him and he moved only slightly closer to Florida, from the Twin Cities to Chicago. He drives enormous traffic to the Poynter site, and in turn Poynter, which pays him $170,000 a year, provides him with an important imprimatur.

He still maintains his Obscure Store site and now also writes a newer blog, Starbucks Gossip, dedicated to the coffee powerhouse.

It was during the Jayson Blair scandal at the New York Times nearly three years ago that Romenesko's website gained a broader audience. He reported on every possible aspect of that, and provided a broad national sampling of what other newspapers were thinking of the Times.

At one point, before the top two editors of the Times resigned under pressure, the newspaper's reporters were outdoing each other posting notes critical of their bosses on Romenesko.

Almost overnight, the site began to serve as a semi-official clearinghouse for journalists—which is now embraced by bosses as well as reporters.

For instance, two years ago, a high-level panel of journalists at the New York Times recommended that the top editors of the paper write a regular column to deal broadly with matters about the newspaper.

The editors declined to follow this suggestion, but in a nod to transparency—and the power of Romenesko—the Times' editors preferred method of addressing the public is the leaked memo that inevitably finds its way to Romenesko.

No newsroom memo of importance from the Times—or elsewhere—escapes being posted on his site. The site also publishes letters.

As importantly, the site serves as a standard setter for journalism.

Jack Shafer, media columnist for Slate and a great fan of the Romenesko site, writes hyperbolically, "The site functions brilliantly as an ad hoc, post-publication, peer review mechanism for the journalistic profession."

In reality, the mere reporting of journalistic transgressions day-in and day-out has a national norm-ing function. If a movie critic in Florida is fired, say, for plagiarizing, can an editor in Oregon do less (no matter the extenuating circumstances)?

In serving this function, though, Romenesko magnifies small acts out of proportion. Every journalistic sin becomes a national story.

There are instances where a reporter has been accused of a minor conflict of interest. Ten years ago, that offense would have been duly noted, and the person might have been reprimanded privately.

Now, thanks to the stigmatizing effect of the Romenesko site, the person is shamed in front of a national audience of peers.

APPENDIX F

RELEVANT LITERATURE

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