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SCHOLARLY COMMUNICATION AND PEER REVIEW
Moving towards Utopia

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ABSTRACT

Movement to fully open-access electronic scholarly publication has been hampered by the conflicting interests of universities, private publishers, researchers themselves, and those who fund research. The situation interacts strongly with traditions regarding peer review and the ways in which researchers establish stature within their fields. Progress to date has led to seemingly awkward and probably transient systems of dual publication or dual publication status, including green, gold, and hybrid open access. There are also efforts to establish pay-to-publish as the standard model to replace pay-to-read. The ultimate situation should be immediate open-access electronic posting of results of all research, with pre-posting peer reviews solicited by the author rather than a journal editor, following any institutional policies regarding the type and amount of pre-publication peer review. There could then also be publications and/or web sites that harvest among posted articles selectively for further attention and may be fee-based, but open-access would be the primary and recognized form of publication. There are several things that research universities can do to encourage this transition. One is to provide or arrange for services to facilitate preparation and posting of articles and books in open-access repositories. Another is to make the contents of repositories readily discoverable in searches. The provost should be a central actor toward these ends, since faculty matters, the library, institutional publishing services, and often computing typically report to the provost. A provost can encourage policies for reviews of faculty members that do not consider pre-publication peer reviews and measures of journal quality and which instead give more attention to cumulative and integrated accomplishments than to individual papers. Shared governance provides useful ways of working with the faculty to promote recognition of the value of online, open-access publication. Engaging the interests and support of the most intellectually respected and senior faculty members can be particularly helpful.

Keywords: Open Access, Scholarly Communication, Repositories, Peer Review, Publication

The rapid growth of capabilities in information technology (IT) provides many opportunities for enhanced publishing and other means of communication among researchers and between researchers and the users of their products. IT can considerably lower overall costs and increase both the reach and rapidity of publication, as well as the effectiveness and convenience of use of research libraries.

Taking full advantage of these capabilities has proven to be a difficult task, however, and has been hampered by constraining webs of commercial interests and history, constricted further by longstanding value structures surrounding publication that interact

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strongly with other aspects of research and academic life. There are numerous actors and factors, both within and outside of universities. Some of those within universities are libraries, academic departments, university presses, research authors, and faculty-assessment criteria and processes. Some of those outside universities are large private publishers, disciplinary organizations that have large research-publishing operations of their own, firms providing software for searching the literature, author-interest organizations, and the ways in which reputations of researchers are established within their disciplines. Even those interests that lie within universities tend to work in isolation from one another and sometimes at cross purposes.

One result of this situation has been high costs for licensing and purchasing library materials, epitomized by the "big deal" negotiations between individual universities or national university systems and large monopolized publishers which serve to secure access to the journals put out by those publishers. These events have major financial consequences for universities but have often been shrouded in secrecy demanded by the publishers[1]. The negotiations typically occur at five-year intervals and are further complicated by the fact that access to electronic materials from the publisher is typically licensed rather than bought for permanent use. Thus continued access to electronic forms of publications from previous years can be on the table along with access to future electronic publications. Other aspects of the situation are the ever-escalating production of new knowledge and consequent growth in the sheer volume of publications and their costs, limitations on library budgets, financial difficulties for university presses, research inefficiencies that stem from there being multiple print and online resources and multiple search techniques of varying sophistication, and practices for research and publication that have become strikingly different among academic disciplines[2].

The situation is further confounded by longstanding practices associated with scholarship and peer review. Peer review stands as the most respected form of academic quality assessment. It is used by editors of journals and books for judging the quality and suitability of materials submitted for publication and to give authors feedback that can lead to improvement of manuscripts, by funding agencies for judging proposals made by researchers, in review processes for promotion and advancement of faculty members, and as a primary criterion for major awards and general standing in the research community. Yet peer review has complications of its own[3], prominent among them being the escalating burden placed upon reviewers by the ever-growing volume of would-be publications and charges of bias, intended or not. Hence peer review for publications has been the subject of a number of change-related experiments, particularly in fields such as biology and medicine[4]. One of the pioneers in this regard has been the Faculty of 1000, now known as F1000[5]. Many of these innovations involve replacing in-depth pre-publication peer review with various forms of post-publication peer review. These efforts have so far occurred more for journal articles than for books.

Researchers often cite the pre-publication peer-review screening process and perceptions of journal quality as being valuable for reducing the number of publications that they have to read and thereby enabling them to use their time more efficiently[6]. However, a persistent author will resubmit a rejected manuscript to other journals or book publishers, usually thereby generating additional peer-review needs and continuing through a string of journals and publishers until one of them does accept the paper for publication. The ability to publish somewhere is assured by the fact that numerous entrepreneurial publishers and journals with dubious standards have cropped up in recent years. Hence the purpose of user efficiency is not really achieved, and considerable researcher time can be consumed in repeated reviews of the same paper. Also, shutting papers out of the literature is a questionable practice in and of itself, since even controversial papers may well generate further ideas that advance a field.

University presses occupy a conflicted, intermediate ground.[7] They are parts of universities but tend to seek authors widely rather than emphasizing authors from their own institution. They usually must be self-supporting financially. That cannot be done solely through their *raison d'etre* of publishing research monographs; they have had to augment their portfolios with better-selling books as well. There have been increased financial pressures on university presses from the reduced purchasing power of academic libraries and the over-abundance of university presses.[8]

In a situation of this complexity and dimensionality it is useful to step back from more specific individual issues, examine the most important overall general goals, assess progress toward those goals, and identify opportunities that can move further toward them. That is the approach taken here.

GOALS

Some general goals should be the following.

- **Enable research to be carried out effectively and efficiently.** Facilitate locating, screening, and user assimilation of reports of research, independent of time and place. Disseminate research results widely and rapidly, thereby accelerating knowledge-based advances and thence contributions to the economy and society, world-wide. Do not block research results behind

paywalls. Instead, utilize open access to the maximum extent possible, thereby enabling full public use of results of publicly funded research and helping independent scholars and institutions in less affluent countries to carry out research, develop their economies of those countries, and interact with the rest of the world, to the benefit of the entire world.

- **Functionally optimize evaluation of the research accomplishments of faculty members.** The purposes for which this is important include promotion and advancement of faculty members within universities and monitoring institutional reputation. This subject interacts strongly with publication since many cost-generating factors tie to practices for the review of faculty members and efforts to gain institutional distinction through ratings processes and other ways.
- **Use IT and other methods to lessen overall costs of the research enterprise within universities, including academic libraries.** View and manage all aspects of conducting and promulgating research in a university as a single system, budgetarily and in other ways.

The following more specific objectives, in combination, are attractive for satisfying these general goals.

- Authors post research articles, monographs, and supporting materials to open-access electronic repositories, which are reliably preserved and are both widely and permanently available and readily discoverable.
- How to obtain peer review in advance of posting is determined by the author(s) and/or the author's institution rather than by the publication medium.
- Authors can modify their repository postings over time, identifying successive versions through version number and date.
- Researchers and other potential readers find and sift publications through ever-more-effective search engines and by the continued growth of push-up methods that notify researchers of new publications of interest.
- Reviews of faculty members for advancement, promotion, awards, etc., should be carried out by knowledgeable peers in the university or awarding society using direct and comprehensive methods of assessment, including solicited views of peers in the field of research of the faculty member.
- There should be renewed, strong projects for digitization of existing print journals and books.
- It should become convention that authors retain copyright to their works.

The first three of these are admittedly at least somewhat controversial. The reasons for them and for the package as a whole are explored in greater depth in the following section.

RATIONALE

Open Repositories: The ArXiv, a large open-access electronic repository started in 1991 at Los Alamos National Laboratory and now hosted at Cornell, was originally for physics and mathematics and has now been extended to computer science, quantitative biology, quantitative finance, statistics, electrical engineering and systems science, and economics.[9] It has taken hold dramatically over time, largely because of the attractiveness to authors of immediate posting and broad reach. It has also spawned similar approaches in some other disciplines, e. g., ChemRxiv.

Electronic publication brings many helpful features for users, including the wherewithal to search among and within documents, the ability to do research from any location, multimedia capabilities not available with print books and journals, live links for references[10], variable font size for users, and the ability for a researcher to have a personal library on a flash drive or through easy access to URLs as opposed to massive and dusty bookshelves. The readability of electronic media continually improves, and materials in electronic form can also readily be printed to paper for reading in the conventional way, if desired, unless that is proactively prevented. There has been a steady transition of journals from print to electronic form.

Open-access electronic repositories can be institutional, discipline- or funding agency-specific, or organized in some other way. For readers, there should be means of transitioning rapidly among different repositories through live URLs, with the effect that the repositories together function effectively as a single repository across disciplines and institutions worldwide. Repositories can be rearranged among themselves over time, as long as content and access are preserved.

Open-access repositories provide immediate, widely available publication. For researchers concerned about the number of books and papers they have to read, there can be selective journals, websites, abstracting services, or secondary repositories that harvest what are viewed as the most important articles by any of various criteria and may or may not charge for access. The important point is that the open-access repository should become the first and primary means of publication.

Direct, open-access repository publication avoids the costs and inflexibility associated with profit-driven publishers as selective middlemen and makes publications and related material instantly available. Further, open-access repositories remove a number of the negative issues associated with perceived hierarchies of journals and publishers, such as re-submissions down the chain and, in an extreme, the practice that has arisen in China of rewarding authors financially in relation to the eminence of the journal in which their articles are accepted for publication.[11] Open-access repositories also greatly lessen or eliminate the incentives for private, would-be publishers of new and relatively non-selective online journals.

Peer Review: Pre-publication peer review should be considered as a benefit to the author and not as a bar to publication. In the electronic age an article or monograph can be posted by an author at will on a web site, and it can readily be found by search engines. Thus a negative editorial decision stemming from pre-publication peer review does not stop a paper from being published; it pertains only to whether it is published in the particular journal for which the review is being carried out.

Feedback before posting or publication is, of course, valuable. Authors are well advised to seek reviews and other commentary before publication of an article or monograph, so as to improve the content and avoid the embarrassment of mistakes and misconceptions. Authors themselves are probably most able to judge the appropriateness of potential reviewers, and they are probably more able than are journal editors to get prompt responses from colleagues. The loss of reviewer anonymity in author-solicited reviews should not, in general, be a problem, in fact it may decrease bias. On the other hand, friends may be too gentle in their reviews, and an author may select only like-minded reviewers. For those and other reasons, there could, and probably should, be guidelines within universities and other research institutions pertaining to how and to what degree pre-publication reviews are obtained, and whether others than the author are involved in the selection of reviewers. It could also be advantageous for names of pre-publication reviewers to be cited in posted papers.

Post-publication peer review will also occur over time through mechanisms such as evaluations in subsequent review papers, compendia of new and outstanding articles, crowd-sourced reviews in the manner of F1000Prime[12], PubMed Commons, and PLoS[13], and selection processes for awards and for journals and/or web sites that use peer review to identify and collect selected publications from open-access repositories.

Successive Versions: Pre-publication peer review may not catch all the issues that need to be addressed in an article or monograph. There can also be unintended errors of interpretation or presentation. For those reasons it is valuable for authors to be able to modify their repository postings of research publications, identifying successive versions clearly through version number and the re-posting date. This practice is already followed in some fields for electronic media, and has long been established for subsequent editions of books. Since this is far more easily done in electronic form than for print publication, it is another advantage of electronic posting.

Search and Sifting Processes: If anything is lost in efficiency and time management for readers through posting of problematic articles and monographs and the need to read them, it should be more than regained through further development of sophisticated means of searching and sifting through the posted literature and bringing items of potential interest to the attention of individual researchers. The anticipated rapid growth in methods of artificial intelligence and data science should help immensely here.

Assessment of Faculty: From the standpoint of research universities it makes sense and would be more effective and efficient to shift the burden of peer review for promotion and advancement of faculty members more toward judgements of the cumulative accomplishments of a person's career, with such reviews then being less devoted to assessments of individual published articles.

Reviews and assessments of faculty members in research universities have drifted excessively towards methods based on simplistic quantitative measures that have come into use over the last few decades. Examples of such measures are citation indices, the h-index, the journal impact factor, the perceived quality of the publisher for a book, and mere counting of the number of papers published. In part, this drift has happened because fields of research have grown narrower, and it is thereby more difficult for faculty members in the institution to judge the research of a fellow faculty member knowledgeably. It is also much easier to use simplistic, quantitative measures than to dive in and try to understand the research in depth. But these quantitative measures

are strongly influenced by the particular type and field of research, can reflect negative as well as positive factors, and can be manipulated, e. g., by dividing one paper into two or more. Journal impact factors and h-indices increase the more researchers there are in a field and have a number of other problematic features[14,15].
It is far better for groups of respected faculty members within the institution of the researcher to use their accumulated insights to review assessments from knowledgeable and respected peers within the field and to make use of other collected, cumulative information so as to make judgements of quality and accomplishment.

Digitization and Copyright: For enabling research to be effective and efficient, the ultimate objective should be to have all articles, journals, and book monographs available in easily accessible, searchable, and cross-referenced digital form. Among the efforts directed toward that end for books have been the Google Books project, HathiTrust, Project Gutenberg, and aspects of the Internet Archive.

A primary complication or barrier for open-access digitization is copyright. There should be easy ways for authors and other holders of copyright voluntarily to submit new and past print books for digitization. Most scholars should be driven more by desires for their written works to be read and used more widely and for longer durations, rather than by the usually non-existent or modest revenues they receive from royalties associated with sales. Hence there should be a growing realization that digitization and open access are valuable steps for authors of existing books and articles as well as for those of new articles and books. Guidance for managing copyright issues and sharing work while retaining ownership is given by Creative Commons[16] and Authors Alliance[17].

Since copyright in the United States now lasts for the author's lifetime plus 70 years, for authors to give away the copyright to a private publisher greatly limits when digitization can occur. Research universities should strongly encourage retention of copyright by authors, as is already happening to a substantial degree. Also, universities should encourage authors to regain copyright ownership from publishers when books go out of print and should help them both in so doing and in subsequent digitization for open-access posting.

PROGRESS SO FAR

Repositories and Open-Access Publication: A first and obvious step already taken by many universities is the establishment and promotion of institutional open-access electronic repositories, a few examples among many being the University of Michigan's Deep Blue, Cambridge University's Apollo, and the University of California's eScholarship. These repositories are presently used mostly for preprint versions of articles before submission to archival journals and for previously published papers that are available without cost or through delayed-posting, open-access agreements. However, they can also serve as the sole means of publication, as long as search engines locate the articles readily. Although it is still less commonly done, repositories can also be the sole means of publication for book-length writings, or can pair, if copyright is managed appropriately, with print versions of books to offer flexibility to readers. The institutional university repositories are supplemented by disciplinary repositories such as ArViv, sponsoring-agency archives such as PubMed Central, and general-purpose sites, such as ResearchGate, Zenodo, and Academia.edu.[18]

It is not enough for an institution simply to provide a repository or access to a repository housed elsewhere. There need to be incentives for faculty members to add their writings to the repository and also clear and simple procedures for them to do so. There are some natural attractions for faculty members in repository publication, including immediacy of posting, ease of access for readers, and hopefully permanency. Papers in a typical university repository will cover a wide range of disparate fields. Thereby university repositories are not likely to be the usual places where researchers will actively look for papers within their own disciplines. Universities can address this issue by coordinating with disciplinary, governmental, and other repositories and promoting methods of search and listing that will enable disciplinary registers and search engines to locate postings within their repositories readily. Efforts to give the assemblage of institutional, governmental, and disciplinary repositories the characteristics of a single, highly searchable repository will help greatly.

So far, the greatest progress toward publication in open-access, electronic repositories has been in cases where there are clear incentives perceived by authors. Two examples are the ArXiv and the working-paper concept that has come about in economics and related fields. The incentives for both are rapid publication and wide reach. PLoS, the publisher of fully open-access journals, required major external financial support during its start-up years, but has succeeded by virtue of its journals having had obvious high quality from the start.[19] The PLoS journals request author payments for publication, although fee waivers are available where warranted.

There has been much less progress toward open-access books, although the number of them being put in open-access repositories does increase. There have been a number of recent efforts within the world of university presses to reduce the costs of preparing and distributing scholarly monographs while making them available in electronic form and holding traditional standards of peer review. Examples are the Toward an Open Monograph Ecosystem (TOME) initiative[20], the Sustainable History Monograph Pilot[21] of the University of North Carolina Press, and the Luminos[22] initiative of the University of California Press.

One result of the contentions between universities and private publishers has been a somewhat bizarre situation of dual publication of research articles, wherein one publication is archival with a publisher via the traditional procedures of pre-publication peer review and the other is an open-access electronic posting. In so-called "green" open access the electronic posting is typically either a working paper, the version submitted to the archival journal for consideration, or the actual archival publication delayed for an embargo period after the appearance of the archival publication.[23] The archival form serves the financial needs of private publishers and adheres to the concepts of journal hierarchies and resultant selectivity, while the open-access version provides immediate posting and rapid communication within the research field. For fast-moving fields the open-access version tends to be the one more used by colleague researchers. The archival versions then serve for polishing and for judgments for advancement within universities.

Another mixed alternative has become a partnership of sorts between universities and publishers, known as "gold" open access, whereby the author, or more typically the author's institution, pays for publication in a journal that provides immediate open access. There are also journals where the author or author's institution can pay a fee and the article becomes immediately open access, even though other articles in that journal are not open-access. This situation is often designated "hybrid" open access. A number of universities have set up fund sources and procedures to cover those costs for researchers who are not able to provide them from extramural grant funds. Going further, some universities and university systems, most notably the University of California in recently suspended "big deal" negotiations with Elsevier, have sought incorporation of full open-access publication for an institution's authors into "big deal" licensing negotiations with major publishers.[24] That university subsequently made such an arrangement with Cambridge University Press.

The dual-publication approaches are awkward and seemingly inefficient. They result from an effort to achieve open access as much as possible in the face of the reality of the roles and influence of private publishers.

Government and Foundations: Universities have natural allies in those government agencies that fund research and share, at least in principle, the motive of making the results of publicly funded research as widely and rapidly available as possible. The same applies to many private foundations that fund research. There has been progress toward open access generated by governmental directives. However, pressures from publishers in the political process have been a significant deterrent to those efforts and have resulted in dilution of what has finally been passed, e. g., enabling allowable 12-month delays ("embargos") before required public posting and placing copyright restrictions on reuse of articles.

Within the United States, the National Institutes of Health (NIH) established a policy[25] in 2009 that publications from NIH-sponsored research should be posted at PubMed Central, an agency repository, no more twelve months after the date of official publication. A 2013 directive[26] from then-Presidential Science Advisor John Holdren asked the other major research-supporting agencies within the federal government to establish policies requiring open-access posting of results from research that they support. The actions adopted allow a possible delay for posting of up to 12 months after initial publication in an archival, "paywall" journal. A similar requirement[27] was adopted in 2018 by the State of California for research sponsored by state agencies. Congressional legislation toward the same or tighter ends and reductions of the embargo period have not yet succeeded, reflecting countering political efforts by private publishers.

The progress in Europe has been greater. The European Commission in 2012 adopted a policy[28] similar to those in the U. S., with the embargo period being only six months. Now, to be effective in 2020, a coalition (cOAlition S)[29] of the European Research Council, fourteen European national governments, the Wellcome Trust (United Kingdom), and the Gates Foundation (United States) have adopted a policy that their grantees must publish their results by open-access means without any embargo delay. In its originally proposed form this requirement could not be met by purchasing open-access status in a "hybrid" journal, but that approach is allowable in the final version.[30]

The logic that public support of research requires public access to the results of that research could be extended to all research carried out in universities that receive public support, even if that support is just for grounds, buildings, and services.[31] Pursuing

that path would encounter the issue that open-access publication would have to be done by all faculty from all disciplines, including those without significant sources of extramural support. The open-access requirements stemming from funding agencies include at least tacit recognition that grants would cover whatever costs are associated with open-access funding.

Peer Review: Efforts to implement crowd-sourced post-publication peer review have been hampered by lack of motivation of those readers best qualified to do such reviews, with the result that there can be an array of less enlightened and/or off-the-wall subject comments appearing with the article, such that they distract from the main messages of the publication.

There have been some efforts to address the problem of successive pre-publication reviews of the same paper by sharing peer reviews among editors of journals from a publisher. However, this has not yet gained widespread popularity.

FURTHER PROGRESS TOWARD UTOPIA

Going beyond the green, gold, and hybrid open-access models toward a world where open-access electronic publication is the norm, where peer review moves toward comprehensive assessment of a researcher's work, and pre-publication peer review is at the instigation of the author and his or her institution requires overcoming three major obstacles of very different sorts. One is the business interests of private publishers, who perceive open access as an existential threat and then use their substantial political clout to discourage government laws and policies that would facilitate open access. A second need is for value systems and practices within the academic world for evaluating and rewarding research to evolve away from perceptions of journal or publisher quality to where the quality of the research itself is the criterion. A third obstacle, slowly being overcome over time, has been a general perception that open-access journals or publishers are lower in quality. This, of course, does not have to be, but the perception has been sustained by the continual sprouting of new electronic journals and publishers of dubious quality.

As already noted, the present situation is one of dualities -- both archival and open-access publications for the same material and both open-access and paywall articles in the same journal, along with both fully subscription-based journals and some all-open-access journals. Going beyond this situation towards the utopian all-open-access approach for primary publication can be spurred if authors more fully and more universally recognize the values of the reach and speed associated with immediate open-access repository posting and if conventions for peer review and distribution of research results evolve so as to reinforce the adequacy and desirability of open-access as the primary publication means.

Services and Coordination within Universities*:* Research universities house many of the component elements of these issues. It therefore makes sense for them to seek ways to coordinate activities internally and provide services that are synergistic toward the desired ends. One approach can be for research universities themselves to provide the functions of the middleman outside publishers.

Currently, the largest shortcoming of the repository mode for sole publication is the lack of proactive marketing or distribution services of the sorts provided by commercial publishers. Universities could develop means of doing that and have done so for university presses. With their IT capabilities universities can work to improve ways for contents of electronic repositories to be found readily in searches. University repositories and libraries should work together to assure that open-access books from all pertinent repositories are referenced along with their sources in the online catalogues of all research-university libraries. This is not yet the case. An ability to appear promptly in all research-university library catalogs should be a large attraction to authors.

A number of universities have adopted policies that encourage retention of copyright by the author and open-access posting. Some of the early adopters along these lines were the University of California, Harvard, Stanford, and the University of Illinois. Compliance with these institutional policies has not been uniform among the faculty, and the policies do not include enforcement provisions that could be seen negatively by the faculty. A crude estimate is that roughly 50% of the recent scholarly literature is available open access, one way or another.[32]

There is therefore still a need to convince many faculty members of the worth of repository and open-access posting, as well as to address the even more difficult issue of how and when peer review is best accomplished. University provosts typically are responsible for libraries, academic publishing efforts, matters of the faculty including review for promotion and advancement, and often either all information technology or at least academic computing. Hence it is provosts who can best work and coordinate efforts towards these ends. A role that is particularly critical for provosts is the development of the values and methodology within the institution relating to peer review. As one example, the provost can work with the faculty and with the various elements of the system for faculty review and advancement to determine and publicize internally that perceptions of the quality of the journals in which a faculty researcher publishes will not be a factor in advancement reviews. Particular targets in these endeavors should be

the intellectually most accomplished faculty members and the faculty members furthest along in their careers. It is easier for those faculty members to make the move to open-access electronic publishing since they have already made their names. Other researchers will look for, and find, their papers anyhow.

At the University of California, there are very systematic and thorough reviews of faculty members throughout their careers for both promotion and advancement within rank.[33] These processes are supported by computer-based systems that include tallies of publications as well as the publications themselves. For example, AP Bears[34] is the internally developed system used for the Berkeley campus. The system used for harvesting materials by University of California authors for the all-UC eScholarship open-access repository is Symplectic Elements[35], developed in the United Kingdom. An opportunity was missed when these two systems were not developed together, since a complete tally of holdings and access to all publications in eScholarship could have been useful in the academic personnel process and, if used in that way, would have served very effectively to enhance faculty interest in using the repository. However, academic-personnel operations are separate organizationally from the library system, which generated the repository. Complicating the situation further, in the University of California the academic personnel systems are at the level of individual campuses, whereas the repository is for all campuses university-wide, i. e., a different administration.

Shared governance, in the form of the Academic Senate and administration working closely together, can be extremely useful for moving toward solutions that are best for the university as a whole. If faculty leaders can become aware of all facets of a cross-cutting issue, they will better understand the overall situation and the interacting factors within it, can appreciate what needs to be done, and can be very helpful in motivating the faculty at large. The Academic Senate involves faculty members from all different disciplines working together. It thereby provides a good avenue for faculty members in different disciplines to learn from one another and to pick up and share best practices. That is important in the present circumstances where the usage of open-access publishing varies greatly among the disciplines. It was through shared governance that the University of California developed its policies encouraging open-access publishing by the faculty – an Academic Senate policy in 2012-13, followed by presidential policy extending the Senate policy to other researchers in 2015.[36] Internal newsletters and other publications can also be useful for spreading broad awareness of issues that involve multiple parts of the university.

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ENDNOTES

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6 See, e. g., Harley & Acord, *loc. cit*., 2011.

7 See, e. g., S. Sherman, "University Presses under Fire", *The Nation*, May 6, 2014. https://www.thenation.com/article/university-presses-under-fire/

8 Universities often perceive having their own press as a badge of stature.

9 https://perma.cc/492V-2H66

10 As the use of URLs for references has grown in the information age, a problem for users of both print and online publication has been the phenomenon of "link rot" (see, e. g., "Link Rot", *Wikipedia*, accessed February 17, 2019. https://perma.cc/BN8M-L2GX), whereby URLs become unavailable or outdated because of website rearrangements, alteration to write-ups, or elimination. There are now services such as Perma.cc, Webrecorder.io, and the Internet Archive, which record and maintain web pages as referenced by authors.

[11] See, e. g., Wei Quan, Bikun Chen & Fei Shu, " The Truth about China's Cash-for-Publication Policy", *MIT Technology Review*, July 12, 2017, https://www.technologyreview.com/s/608266/the-truth-about-chinas-cash-for-publication-policy/; "Publish or impoverish: An investigation of the monetary reward system of science in China (1999-2016)", *ArXiv*, https://arxiv.org/ftp/arxiv/papers/1707/1707.01162.pdf.

[12] See https://perma.cc/G7QP-YRBJ

[13] PLoS = Public Library of Science

[14] See V. Larivière & C. R. Sugimoto, "The Journal Impact Factor: a brief history, discussion, and critique of adverse effects", *ArXiv* (2018). https://arxiv.org/ftp/arxiv/papers/1801/1801.08992.pdf

[15] See, e. g., C. Barnes, "The *h*-index Debate: An Introduction for Librarians", *J. Acad. Librarianship*, 43, No. 6, pp. 487-494, 2017. https://www.sciencedirect.com/science/article/pii/S0099133316301732?via%3Dihub

[16] https://creativecommons.org/share-your-work/

[17] https://www.authorsalliance.org/our-issues/managing-rights/

[18] K. Fortney & J. Gonder, "A social networking site is not an open access repository", Open Access @ UC, University of California, December 1, 2015. https://osc.universityofcalifornia.edu/2015/12/a-social-networking-site-is-not-an-open-access-repository/.

[19] https://perma.cc/KKT8-YJDR

[20] https://www.arl.org/focus-areas/scholarly-communication/toward-an-open-monograph-ecosystem; https://perma.cc/LNE6-22Q7

[21] http://www.longleafservices.org/blog/the-sustainable-history-monograph-pilot/; https://perma.cc/PXM9-E9XY

[22] Luminos, University of California Press, Oakland CA. https://perma.cc/W7Z7-BXXF

[23] Depending upon policies of the archival journal, it may also be some other form.

[24] L. Ellis, "U. of California System Cancels Elsevier Subscriptions, Calling Move a Win for Open Access", *Chronicle of Higher Education*, February 28, 2019. https://www.chronicle.com/article/U-of-California-System/245798

[25] https://perma.cc/DVW3-3EJT

[26] https://perma.cc/ML52-ZXLZ

[27] https://perma.cc/V3NN-FTEJ

[28] https://perma.cc/H9EM-WPCV

[29] https://perma.cc/Z3ZT-C5ZT

[30] T. Rabesandratana, "European Funders Detail Their Open Access Plan", *Nature*, Nov. 26, 2018. https://www.nature.com/articles/d41586-018-07557-w

[31] A counterargument can be that universities receive indirect cost allocations with research grants in recognition of these general costs. But a counterpoint to that is that the 26% cap on Facilities and Administrative costs in Office of Management and Budget Circular A-21 means that there is not complete coverage of these extra expenses. Further, there is simply an argument that public universities are for the public.

[32] H. Piwowar, et al, "The state of OA: a large-scale analysis of the prevalence and impact of Open Access articles", https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5815332/; É. Archambault, et al., "Proportion of Open Access Papers Published in Peer-Reviewed Journals at the European and World Levels—1996–2013", Science-Metrix, European Commission, Oct. 22, 2014. https://perma.cc/J6HG-CH2D

[33] C. J. King, *The University of California: Creating, Nurturing, and Maintaining Academic Quality in a Public University Setting*, Chapter 11, Ctr. for Studies in Higher Education, University of California, Berkeley, 2018. https://escholarship.org/uc/item/6rj182v7

[34] https://apapps.berkeley.edu/home; https://perma.cc/6TTU-7TTY

[35] https://symplectic.co.uk/products/elements-3/; https://perma.cc/S7ZR-9ZDV

[36] https://osc.universityofcalifornia.edu/open-access-at-uc/open-access-policy/; https://perma.cc/6JDB-92XK