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Perspectives on Using E-Journal Usage Statistics in a Serials Cancellation Project

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Perspectives on using e-journal usage statistics in a serials cancellation project

By Andrée J. Rathemacher and Michael C. Vocino

Introduction [[[heading]]]

In fall 2007, the University Library at the University of Rhode Island (URI) found it necessary to cancel over $200,000 in serial subscriptions. We had been aware since late summer that our fiscal year 2008 budget was inadequate to cover the cost of our subscriptions, however we were told by the University to refrain from canceling any journals in the hope that supplementary funds for the library could be identified. In early October, when no additional funding had been made available, we proceeded with the cancellation of journals. Given that our list of titles to renew was already overdue to our subscription agent, we had only two weeks to identify titles to cancel. Lacking the time to involve librarian subject specialists and university faculty in the decision, we decided to base the cancellation on what we thought was the most objective measure available to us at that time: usage statistics of electronic journals. This chapter reviews our process and examines a number of problems and issues that we encountered in using usage statistics as a basis for canceling electronic journals.

Background [[[heading]]]

The University of Rhode Island holds the Carnegie Classification of RU/H (research university with high research activity). The University Libraries serve the full time equivalent (FTE) of 13,790 students and 713 faculty and consist of the University Library, serving the main campus

in Kingston, and two branches: The College of Continuing Education Library in Providence, and the Pell Marine Science Library in Narragansett, which serves the Graduate School of Oceanography.

In fiscal year 2007, the materials budget for the University Libraries was approximately $2.9 million. Of this, over $2.6 million, or about 89%, was spent on serials and other continuing resources, including online databases. A large portion of the Libraries' continuing resources were in electronic format. If online databases are included, we devoted 75% of our serials budget and 67% of our total materials budget to online resources. Excluding online databases (but including all electronic journals purchased either individually or in packages), we spent 56% of our serials budget and 50% of our total materials expenditures on online journals.

These numbers are quite high compared to other research libraries, large or small. In terms of serials expenditures as a percentage of total library materials expenditures, the median value for libraries surveyed by the Association of College and Research Libraries (ACRL) in 2006 was 65.74%, compared to our 89%. Summary data gathered from ACRL's 2006 survey reveal that ACRL libraries spent approximately 14% of their total materials expenditures on electronic serials (including online databases), compared to URI's 67%. Even when the University of Rhode Island Libraries are compared to much larger Association of Research Libraries (ARL) libraries, we see that a relatively large portion of our budget is devoted to online journals. In 2006, according to statistics gathered by ARL, approximately 37% of the material expenditures of ARL libraries were spent on electronic serials, not including electronic databases, while the URI Libraries spent 50%.

The fact that such a large portion of our materials budget is spent on online resources is largely due to the fact that in early 2002, the Libraries' management team adopted a policy of converting print subscriptions to online-only when online was available and did not cost substantially more than the print. Beginning in subscription year 2003, we have incrementally converted a large number of our subscriptions to online-only format. While some of our print titles were converted to online through the purchase of packages such as Elsevier's Science Direct, the Institute of Electrical and Electronics Engineers (IEEE) All Society Periodicals Package, American Chemical Society Web Editions, and Project Muse, a large number were converted as individual, online-only subscriptions from Blackwell, Wiley, Taylor & Francis, Cambridge University Press, Springer, Sage, and other publishers. When a title was changed to online-only format, the corresponding print was canceled; staffing and budget levels did not allow us to maintain multiple formats. By fall 2007, excluding titles accessed through full-text indexing and abstracting databases, about 60% of our electronic serials dollars (representing 70% of our e-journal titles) was spent on packages, while 40% of our electronic serials dollars (representing 30% of our e-journal titles) went toward individually subscribed e-journals.

Method [[[heading]]]

In previous years when the University Library undertook large serials cancellation projects, library subject selectors typically consulted with academic departments over a period of months to identify titles to cut. In 2007, due to delays by the University administration in finalizing the Libraries' budget, we did not have the luxury of time. Faced with the need to identify over

$200,000 worth of serials to cut in a two-week period, we decided to cut individually-subscribed, online-only journals based on usage statistics. We did not consider canceling online reference databases, since we subscribe to them on a July-June cycle, and they had already been renewed. We also did not look at canceling any of our large packages of online journals like Science Direct or Cambridge Journals Online because we had signed multiple-year contracts for many of these packages, and because canceling packages requires an "all or nothing" approach — cancellation of part of a package is not possible. Fortunately in this case, due to chronic budget shortages we had not been able to participate in many of the "big deal" packages. Thus many of our online journals were individually subscribed, giving us a fairly large pool of titles that we were free to cancel.

We briefly considered canceling print periodicals but realized that identifying which titles to cancel was not possible in such a short time because we had no readily available data on which to base a cut. As mentioned above, we had no time to seek input from faculty. Other libraries use interlibrary loan statistics and citation and impact data in their cancellation processes (Enssle and Wilde 2002, Galbraith 2002, Bordeaux et al. 2005), but we did not have such information at hand. In addition, the University Library at URI has not circulated print journals since a brief period in the mid-1980s, and we have never kept statistics on the re-shelving of print periodicals, so usage data for print was non-existent. We were also aware of the fact that canceling those titles that remained in print-only format would disproportionately punish small, independent, and/or non-profit publishers who are not responsible for the crisis in serials costs{1}.

Since 2006, we have been tracking usage statistics for our online journals when such statistics are available. For each database and platform, we download the Counting Online Usage of Networked Electronic Resources (COUNTER) Journal Report 1: Number of Successful Full Text Article Requests by Month and Journal. We merge all of the reports into one large spreadsheet and add columns for journal price and cost-per-use. This lets us calculate cost-per-use by title for individually subscribed titles. For e-journal packages and full-text databases, we calculate a total cost-per-use for the package but not for the titles within the package.

We decided to cancel titles based on number of uses rather than cost-per-use, primarily because looking at number of uses was simpler and faster given our time constraint (see further discussion below). We sorted the titles in our 2006 usage spreadsheet by total number of articles downloaded and began identifying titles to cancel starting with those with 0 uses for 2006 and continuing until we reached our goal of canceling over $200,000 in subscriptions. In practice, this resulted in canceling titles with 10 or fewer uses. Any titles in packages or databases that could not be individually canceled were skipped.

The list was then double-checked to make sure all usage for each title had been counted. For example, if usage for a particular title was recorded on both the MetaPress and informaworld platforms, or on both Blackwell Synergy and EBSCOhost Electronic Journals Service (EJS), the usage from each platform was combined. Usage from JSTOR and full text databases, for example ABI/Inform and Academic Search Premier, was not included, although it is likely that the availability of a journal through JSTOR or a full text database cannibalized usage on the platforms we tracked, making it more likely that the journal would be canceled {2}.

Finally, 2007 usage available as of October 2007 was gathered for those titles on the cancel list. The number of months for which 2007 usage data was available varied by platform, so it was "pro-rated" to convert available 2007 usage to the equivalent of 10 uses or fewer. For example, if data were available through May 2007, a journal would be cut if used 4 or fewer times (5/12 x 10 uses = 4). If a title had been used 5 or more times through May 2007, it would be removed from the cancellation list, "saved" by its 2007 usage data. This was a crude process, but one which served to compensate for growth in use of a journal over time or for discrepancies in the 2006 statistics. In cases where anomalies cropped up (for example, if we found that a journal had changed platforms mid-year and access had not been activated on the new platform), we gave the journal the benefit of the doubt and removed it from the cancellation list, choosing to take a conservative approach and decrease the possibility of canceling a title in error. When this process was complete, we had identified 304 titles to cancel, totaling $219,000.

Problems and issues we faced [[[heading]]]

Throughout the process of identifying titles to cancel based on low levels of use, we struggled to compile complete usage information on our electronic journal subscriptions and to normalize irregularities in the data. In the process, we were confronted with a number of problems to solve and choices to make before we could proceed. We also found that our decision to cancel based on usage unequally impacted different subject areas and academic departments.

Labor of gathering [[[sub-heading]]]

When we started the cancellation project, we had already gathered 2006 e-journal usage data from most of our vendors. Combining 2006 usage from all of our e-journal platforms from which we were able to retrieve statistics resulted in a spreadsheet of over 4,500 lines. Adding usage from full-text indexing and abstracting databases in order to see the full usage for every title brought the total number of lines to over 10,000. Since vendor-supplied usage statistics don't include local cost data, the price paid and subject-based fund code for each title needed to be looked up in our library system and added to the sheet, and a cost-per-use calculated. Fortunately, this step was easier for titles in packages and databases, since these titles aren't priced individually. Nonetheless, this process was time consuming.

We found that the data needed further modification if we were to use it as the basis for sound decisions on titles to cancel. We needed to be able to sort the spreadsheet by title, ISSN, total uses, journal price, cost-per-use, and subject-based fund code. This was difficult because some vendors use leading articles such as "The" in the title, and Excel does not ignore leading articles when sorting. Using find and replace to eliminate these articles was cumbersome, as each instance needed to be corrected individually so that the article was not deleted if it appeared elsewhere in the title. Some platforms also provided alternate versions of a title; for example, a title from the IEE might be listed as "IEE electronics systems and software" on one platform and "Electronics systems and software" on another. ISSNs appeared with and without dashes, and in some cases leading zeroes needed to be added in order to allow the spreadsheet to be sorted by ISSN. As Kraemer notes, "The formats and contents of publisher-provided use data reports vary widely, even if many of them comply now with the COUNTER requirements. Seemingly small

variations, e.g., an unusual ISSN format [no dash just numbers] require special attention before that data can be merged with other data, for example, prices from invoices" (2006, 165-6).

Creating a usable spreadsheet was also complicated by the fact that many platforms provide usage statistics for unsubscribed titles. It was difficult to tell if a title had zero uses because the library was not subscribed, or if the journal was simply not used. Verifying the status of all these titles was a huge task. An alternative would have been to disregard usage data for any title with zero uses, but this could have resulted in ignoring an unused but subscribed title. Another issue, as noted by Noonan and McBurney (2007, 155), is that many vendors do not include titles with zero hits in their statistics. During our cancellation project, for example, we found that Taylor and Francis's new platform, informaworld, instead of reporting zero uses for subscribed titles that were not used at all during the year, simply excluded zero-use titles from our institutional report.

To further complicate matters, most journals offer free access to selected articles, especially highly cited articles, and some publishers, notably Sage, offer free trial periods for all their journals during the course of a year. It is inevitable that a library's users will access free articles at some point, and these uses will be tallied in the statistics. We found it confusing when payment data for these "free" journals could not be found. We needed to decide whether to remove the usage data for "free" titles from the spreadsheet or to retain it with a notation that access was not paid for. Boots and her colleagues report similar experiences: "The sheer variety of different formats in which journals usage statistics are available makes it very difficult to select, collate, and use them effectively... Just to give a flavor of the practical issues that are

faced, in many cases it is necessary to wade through the statistics for unsubscribed titles in order to navigate to the ones we want" (2007, 189-90).

Fortunately, there are a growing number of products and services available to help libraries with the task of gathering, normalizing, and analyzing usage data; this will undoubtedly be a growing market in the future, especially as vendors become SUSHI compliant. These products are not inexpensive, however their cost may be justified by staff time saved and sophistication of analysis offered. At the University of Rhode Island, we look forward to using our newly-acquired Innovative Interfaces electronic resources module (ERM) during future analysis of serials usage to accomplish many of the tasks detailed above.

If publisher does not provide statistics [[[sub-heading]]]

Like Noonan and McBurney (2007, 1566) and Galbraith (2002, 85), we encountered the problem of publishers that do not provide usage statistics for their online journals. At the University of Rhode Island, only a small number of the publishers whose journals we subscribe to do not offer usage statistics, and they tend to be smaller publishers. As of the date of this writing, for example, the following are some of the publishers from whom we are unable to get usage journal statistics: the American Mathematical Society, the American Society of Limnology and Oceanography, the Canadian Mathematical Society, the History Cooperative, Human Kinetics, Inter-Research, Liverpool University Press, the National Council of Teachers of English Journals, New Left Review, the Rocky Mountain Mathematics Consortium, the Royal Society of New Zealand, Slack, and the Society for the Experimental Analysis of Behavior. When asked,

some of these publishers indicated that they are in the process of developing usage statistics reporting capabilities, while others were unaware of the existence of usage statistics or simply had no plans to provide them.

It is interesting to note that in at least some cases, publishers appear to be unwilling to provide usage statistics. For example, the URI Libraries subscribe to titles from a number of societies published by Allen Press. Some Allen Press societies, for example the American Association on Intellectual and Developmental Disabilities, the American Meteorological Society, the Ecological Society of America, and the Geological Society of America, offer access to usage statistics on the Allen Press platform. Other Allen Press societies do not offer statistics, for example the American Fisheries Society, the American Society of Mammalogists, and the Wildlife Society. Since usage statistics are generated by the Allen Press platform on which the journals are hosted, providing usage data requires no additional technological capabilities on the part of the society. It would seem, therefore, that Allen Press societies not providing usage statistics simply do not want to.

As Noonan and McBurney state, "This lack of information makes it very difficult for the library to make informed collection development decisions" (2007, 156). In our cancellation project at the URI Libraries, online journals without usage data were not considered for cancellation. A lack of statistics shielded these titles from being cut. It may be to a publisher’s advantage to not offer usage statistics when it comes to retaining subscribers; if a journal has low usage, it might get canceled, but if a journal does not report usage at all, it is likely safe, at least from cancellations based on usage statistics. Peters speculates, "Some vendors may be reluctant to

supply usage statistics, because they are fearful that low or uneven usage may cause libraries or consortia to demand changes in pricing, terms, and scope of content when license agreements come up for renewal" (2002, 43). Of course, it is conceivable that some libraries would consider the availability of COUNTER-compliant usage statistics to be an important factor in deciding whether or not to subscribe to an online journal in the first place, or in whether to retain a subscription.

Publishers packages [[[sub-heading]]]

A similar problem occurs with large packages of e-journals from a single publisher, known as "portfolio" or "big deal" packages. Although usage statistics are available for individual journal titles in the package, licensing agreements prevent the selection or deselection of journals on a title-by-title basis.

At could be expected, at the University of Rhode Island our ability to cancel e-journals based on use was constrained by the portfolio packages to which we subscribed. At the time of our cancellation project, we subscribed to Elsevier's Science Direct Freedom Collection, Sage Premier, Cambridge Journals Online, the IEEE All-Society Periodicals Package, and the American Chemical Society's Web Editions. Since we were not prepared to cancel any of these all-or-nothing packages, we could only select titles for cancellation from among our individually-subscribed e-journals. Interestingly, those publishers hit the hardest in our cancellation (Blackwell, Springer, and Taylor and Francis - see table) also offer large packages of titles, however we had not subscribed to any. Our experience offers a clear illustration of how

titles in the big deal packages were "protected," while unpackaged titles were cut. While the big deal packages offer convenience of administration and low cost-per-use, the fact that we subscribed to them made it impossible for us to cancel the lowest use titles across the board. To a large extent, we have lost our ability to shape our collection to the demonstrated needs of our users as indicated by usage statistics.

[[[Insert Table 1 here]]]

Could the trend among publishers toward creating these large packages of pre-selected titles be connected to the demand for and increased availability of COUNTER-compliant usage statistics? No doubt, to a large extent publishers have been motivated to create packages as a way to stem losses incurred by libraries canceling subscriptions due to budget constraints and journal price increases. However, given the shift toward online journals and the availability of usage statistics, libraries are now better able to see evidence of the truism that a relatively small number of journal titles account for the majority of use, while a large number of titles receive very little use. {3} Might another incentive for publishers to create these packages have been to avoid the possibility that librarians would cancel individual titles revealed to have such low use?

Total use or cost-per-use? [[[sub-heading]]]

One of the most difficult decisions we needed to make was whether to rank journals for cancellation by total use (defined as number of full-text articles retrieved) or by cost-per-use (defined as the price of the journal divided by the number of full-text articles retrieved during the

subscription period), or both. Total use is a measure of the importance placed on the journal by the library's users, while cost-per-use is essentially a measure of the journal's "bang for the buck." Each has its advantages and disadvantages, both practical and philosophical.

Total use [[[sub-sub-heading]]]

At the University of Rhode Island, we made cancellation decisions based on total use because of our sense that it was more clear-cut than cost-per-use, and less subject to error. Ideally, total use for a journal should be calculated by combining the use of that title on all platforms on which it appears, including any full-text databases or archival products like JSTOR. Even though the use of a title in JSTOR or a full-text database is distinct from the use of the title on the publisher's platform (and may not cover the same dates of publication), it is likely that use on the publisher's platform is diminished by the availability of the title through other providers. The most sound decisions will therefore be made on complete usage data. Of course, use of the journal on different platforms should be examined individually as well. Any title changes that might cause split usage should be accounted for. The consolidation of usage data for each title is time-consuming unless performed by an automated system, but it is procedurally uncomplicated and presents a fairly accurate measure of how much a journal has been used by a library's clientele. We also found total use to be simpler to work with than cost-per-use when totaling or averaging data across multiple usage periods, for example over eighteen months or two years.

Cost-per-use [[[sub-sub-heading]]]

We discovered that correctly calculating cost-per-use, on the other hand, is far more difficult, if not impossible. There are many factors which can cause errors when calculating cost-per-use. Title changes and platform changes can result in split use numbers which must be consolidated for an accurate cost-per-use figure to be calculated. The failure to consolidate split usage might result in a title being canceled due to high cost-per-use: for example, if the title changed mid-year and the cost-per-use were calculated on the use of the current title only, the cost-per-use number might be twice as high as it should be. If some of a journal's use comes from a full-text database, for example Academic Search Premier or ABI/Inform, or from an archival product, for example JSTOR, the uses from these products should *not* be used to calculate cost-per-use of the journal as subscribed directly from the publisher, as these products have their own costs and costs-per-use. Yet it is inevitable that the use of the journal on the publisher platform will be lower due to the full text also being available through these aggregator products. Simply put, most cost-per-use numbers are likely to be inaccurate, as it is usually impossible to accurately match the total use of a journal with the journal's price. Basing decisions on total use instead of cost-per-use allows the use on all platforms to be combined into a total measure of how heavily the journal is used, independent of how the content has been paid for, or even if the content has been paid for (in the case of free back files).

Furthermore, in most cases cost-per-use is calculated on the price of the current year's subscription. In almost all cases, however, total uses as reported in vendor-provided usage data are for multiple years of content. The amount of content available online varies for each title, and usage data are not broken down by year of publication. Technically, to arrive at a correct cost-per-use number, the subscription prices for every year for which content is available should be

added together and only then divided by total use. For this reason alone, cost-per-use numbers are inherently flawed.

Cost concerns [[[sub-sub-heading]]]

Ranking journals for cancellation or retention based on cost-per-use means that if two journals are used the same number of times, the less expensive title might be retained while the more expensive title might be cut. In this way, higher priced journals with less use will be penalized. It is important to note in such a case, though, that while one journal is less of a value dollar-wise, the actual use-value of the two titles is the same; articles from both were used the same number of times.

We librarians have always known that one use of a chemistry journal costs more than one use of a literary magazine, or that one use of a business journal costs more than one use of a history journal. We've accepted this disparity in price between journals in different disciplines as part of the environment in which we work. A strict examination of usage data by cost-per-use would tend to favor journals in disciplines with lower journal costs and threaten with cancellation journals in disciplines with more expensive journal titles. For this reason, if cost-per-use is to be used as the basis of a cancellation decision, it should be done discipline by discipline, not across the board. (Ideally, cancellation decisions based on total use should also be made by discipline, since different disciplines use journals with different levels of intensity.)

However, if one of the goals of a cancellation project is to eliminate overpriced journals, an alternative method to ranking subscriptions by cost-per-use would be to start by ranking all of the library's subscriptions by price. Then, total usage for the most expensive titles could be examined more closely to see if these titles were used heavily enough to make a subscription worthwhile.

What difference does it make? [[[sub-sub-heading]]]

It is certainly true that canceling based on cost-per-use rather than total use results in higher-priced journals being cut. Since the goal of most serials cancellation projects is to reduce the library's budget by a set dollar amount, canceling based on cost-per-use will result in canceling fewer titles, while canceling based on use will result in a greater number of titles being cut.

At the URI Libraries, we canceled based on total use. As a result, to save approximately $219,000 dollars, we cut 242 subscriptions, or 304 titles, since some titles were bundled. As a comparison, a rough examination of our usage data sorted by cost-per-use indicates that if we had canceled on cost-per-use instead, to save the same amount of money we would have canceled only 160 titles. These 160 titles were more heavily used by our researchers and students than the 242 we actually cut, but they provided less use per dollar spent. Only 34% of the 242 subscriptions canceled based on total use would have been cut if the criterion had been cost-per-use, while 53% of the titles that would be cut based on cost-per-use would also have been cut based on use. Together, there was only 26% overlap among the 402 titles identified for cancellation by each method.

Effect across disciplines of cutting based on usage [[[sub-heading]]]

The mechanics of working with usage statistics aside, canceling journals based on usage is likely to mirror and exacerbate resource inequalities between disciplines. At the University of Rhode Island, as at many universities, faculty have been under pressure to secure grant support, which usually funds release time for their research. In terms of resource allocation, the University has placed a particularly strong emphasis on biotechnology and related fields in the applied sciences. Meanwhile, student enrollment has grown, and many faculty in the humanities and social sciences face increasing class sizes, and therefore presumably less time to conduct research. These disparities are doubtless reflected in the usage statistics for online journals. If journals in the humanities and social sciences with low usage are cut because faculty in these areas haven't had the time or resources to engage in research, losing access to these journals will only perpetuate and intensify the problem, leading to future discrepancies if resources are allocated based on research productivity.

In fact, the most-heavily hit departments in our usage-based cut were those who have been struggling. The Department of Economics lost twenty-one titles, the largest number of any department. This is not surprising, given that during the period of usage examined, of nine total faculty positions, the department had one vacancy, one faculty on sick leave, two approaching retirement, and two working on a temporary basis for other departments or programs. Other hard-hit departments were History (16 titles), Political Science (14 titles), Education (12 titles), Biological Sciences (12 titles) and Mathematics (11 titles).

It is clear that basing usage statistics on only one or two years of data, as we did at the URI Libraries, disadvantages a department that has had a retirement or sabbatical, especially of a researcher who worked in a specialized subject area. In this case, the specialized field may still be important to the department and the curriculum, but due to the vacancy, not be reflected in current usage statistics. Other authors have noted similar fluctuations in usage patterns based on research activity and differences between disciplines. Noonan and McBurney, of the Pacific Northwest National Laboratory (PNNL), state that, "Research trends change periodically at PNNL because of new scientific fields emerging, funding from the Department of Energy fluctuating, the ebb and flow of grant proposal cycles, etc. Usage statistics often mirror the research landscape -- its natural ups and downs and the changing of directions into new emergent areas" (2007, 155).

The effects of these anomalies in usage statistics could be lessened by basing cancellations on an average of total use or cost-per-use over a period of several years, or by following trends in the usage of each title over time. As systems are developed to better help libraries track and manipulate usage data, and as more years of data become available, this will become feasible. One alternative is to compare usage of a particular e-journal or set of e-journals to usage at a peer institution (Peters 2002, 44). Another possibility is to compare the usage of journals within disciplines (Enssle and Wilde 2002, 267), subject areas, or user groups (Luther 2001, 123). In any case, "in a large and multidisciplinary institution, it may be important to protect the needs of small user groups" (Boots et al. 2007, 185).

Beyond the realm of an individual library, it is possible that widespread cancellation of journals based on usage could have far-reaching effects. Morrison addresses the potential problems caused by the cumulative effects of many libraries canceling journals based on popularity: "At any given time, some areas of scholarly endeavor are likely to be more popular and/or better funded that other endeavors, regardless of their underlying merit" (2007, 176). Morrison states further, "There are some real potential pitfalls if usage becomes prevalent as the basis for selection and cancellation decisions. There is reason to suspect that the cumulative effect of such decisions, made separately by many libraries, could create a tendency toward an overall increase in scholarly conservatism; the loss of important, but less popular or less well-funded areas of research; detrimental effects on smaller research communities; and less linguistic and cultural diversity. Journals allowing open access options such as self-archiving could also be adversely affected. Happily, open access not only can, but almost certainly will, counter many of the unfortunate effects of such decisions" (2007, 181).

Of course, the commercialization of scholarly communication and the consolidation of scholarly journals into the hands of an ever-smaller number of for-profit, multinational publishing conglomerates is probably an even greater threat to the diversity of scholarly research (as well as the primary cause of the price inflation that make journal cancellation projects necessary). Nonetheless, Morrison's points are thought-provoking and worthy of consideration.

Conclusions [[[heading]]]

We have outlined in this chapter the consequences of canceling electronic journals based on usage statistics within a two-week window. We have demonstrated that it can be done, but that such a project has flaws and drawbacks. Canceling based on usage statistics alone disregards other factors, perhaps most importantly, the input of faculty and the professional judgment of librarians. Decision-making based on usage data in isolation also lacks the context that might be provided by examining the statistics by discipline or in relation to peer institutions. Usage-based journals cancellations might perpetuate inequalities among disciplines within an institution and academia at large.

Furthermore, an in-depth look at usage measures shows that they are not as objective as they seem. To make meaningful decisions, it is essential to normalize the data to take into account many factors, including title changes, multiple platforms, and varying amounts of online content. Fortunately, working with usage data will become easier in the future with the further development and increasing sophistication of systems to gather, store, and manipulate the data, as well as with the continued refinement of standards for their collection.

Notes [[[heading]]]

{1} According to Crow (2006), "Commercial publishers now play a role in publishing over 60 percent of all peer-reviewed journals…While the for-profit segment comprises a relatively small number of large commercial publishers, the non-profit segment represents a large number of mostly small publishers…The prices for commercially-owned journals average four to five times higher than for journals published by societies…" See also ARL (2004), Bergstrom and

Bergstrom (2001, 2006), McCabe (2002, 2004), Susman et al. (2003), and White and Creaser (2004).

{2} This leads to a dilemma: If a journal's total use is high in part because of its availability through a full-text database, should the individual subscription be retained because of high total use or canceled because much of that use comes from another subscribed service that will continue to provide (at least partial) access to the journal after it is canceled?

{3} See Trueswell (1969), Morse and Clintworth (2000), Bordeaux et al (2005), and Galbraith (2002).

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