Usage statistics and online behaviour (2)

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This updated chapter looks at the reasons for collecting usage statistics at both local and national level and identifies the various sources available. Some of the issues involved in the collection of usage statistics are considered and particular mention is made of the success of COUNTER in introducing greater consistency and reliability. Methods of analysing usage statistics with a range of other variables are put forward. These can be used to build up a picture of online usage and to provide a firm quantitative basis for more qualitative research into user behaviour. Issues that may impact on usage statistics and online behaviour in the future are also briefly considered.

The original version of this chapter (published in 2006) can be accessed at http://uksg.metapress.com/openurl.asp?genre=article&id=doi:10.1629/9552448-0-3.2.1

Introduction

This chapter sets out to explore the variety of statistics that are now available to measure use of electronic resources, and some of the issues connected with them. It will look at how reliable usage statistics can form the basis of a range of analyses at both local and national level and how usage statistics combined with other data can present a picture of how online services are being used. The chapter is based mainly on research within the UK higher education community, but the findings are applicable to any library or group of libraries that wishes to explore more fully their use of online resources.

Evidence Base is a research and evaluation unit based within Library and Learning Resources at Birmingham City University and over the past few years it has conducted a number of studies on the usage of electronic resources within UK higher education libraries. These have included:

Study and analysis of usage statistics for the UK NESLi2 deals

The NESLi2 study aimed to provide JISC Collections and its Journals Working Group (JWG) with accurate and up-to-date data on national use of journals available through the NESLi2 initiative[1]. This is the UK national scheme for the licensing of e-journals on behalf of the higher and further education and research communities. The study took usage data from four major NESLi2 publishers for 17 higher education libraries over an 18-month period (January 2003 – June 2004) and analysed these in relation to cost, price, subject category and usage range. A framework for analysis was devised that could be further developed with other libraries and publishers. The study provided evidence of the difficulties inherent in the interpretation and analysis of usage statistics and the amount of time needed to achieve meaningful results. Recommendations for providing support to libraries in their analysis of the value of the NESLi2 deals included the provision of a usage statistics portal, for which a prototype has now been developed.

A summary report of the study findings can be found on the NESLi2 website[2].

Assessing the value of the NESLi2 deals

In a further study for JISC Collections[3], Evidence Base developed the methodology devised for the analysis of NESLi2 usage statistics to provide suggestions for libraries on how they could firstly assess the value of a deal prior to purchase, and then assess how much it had been used, as an aid to renewal decisions and library promotion.

E-measures project and the SCONUL Annual Library Statistics

The e-measures project was funded by the Higher Education Funding Council for England (HEFCE) under the Good Management Practice Programme and aimed to assist libraries with the use of statistics for decision-making and user support. As part of this project, Evidence Base worked with the Society of College, National and University Libraries (SCONUL) to devise a set of performance indicators for electronic resources for inclusion in the SCONUL Annual Library Statistics[4]. In addition to the amount of data collected from a sample of 25 higher education libraries, the project highlighted the variety of methods in use for data collection and the issues that libraries then faced in attempting to get reliable and consistent data.

The new e-measures questions allowed SCONUL to gain a picture of the extent of the shift to electronic delivery in the UK higher education sector at that time and enabled performance ratios to be established[5]. First introduced in 2003–4, the e-measures questions are currently being revised and updated by the SCONUL Working Group on Performance Improvement (WGPI) to take account of the changes in electronic services over the past few years and their growing importance.

Evidence Base Publisher deal project

Evidence Base is also working with a group of higher education libraries on the analysis of selected NESLi2 publisher deals[6]. Over 20 libraries have now taken part in this self-funding project, which supports libraries in developing management reports based on the analysis of usage statistics using templates and manuals devised for the project.

Why collect usage statistics?

In the present economic climate, providing evidence of the use that is being made of the library's e-resources must be seen as an essential element of good management. Without evidence to show how e-resources are being used, it is very difficult to demonstrate the value of the resources in which the library has invested, either in monetary 'cost-per-use' terms or in terms of the impact on the university's learning, teaching and research. Usage statistics therefore underpin much of the analysis that is needed for directors of library and information services to demonstrate the value of the library's contribution to stakeholders, be they heads of academic departments or university senior managers.

Challenges to the 'big deal' approach by Rolnik[7], Taylor-Roe[8] and others show how important it is for libraries to have accurate information on how a particular deal is being used and whether it offers good value for money.

In this environment, it is important first of all to determine the purpose for which usage statistics are needed as this will help decide what statistics to use and how they are to be analysed and presented. Some major reasons are given below, with examples of questions that can be asked.

Budgeting
■   How do usage statistics demonstrate value for money and justify the library's expenditure?
■   What is the balance of spending and usage in different subject areas?

Making renewal decisions
■   How much has the resource been used?

- What is the average cost per request?
- How many titles in the deal are receiving nil or low use?
- How do average costs, total costs and usage patterns compare with other deals?
- What is the value of subscribing to a deal rather than to individual subscribed titles?

Library promotion and publicity
- How many requests for a particular group of resources have there been over a specified period?
- What is the percentage increase in usage over time?

User support
- Are there particular resources that are not being used as much as expected?
- Should more attention be given to promotion?
- Which are the most popular routes for access? (Google, Google Scholar, directly from publisher, A–Z library pages, through library catalogue, link resolver, etc.)

Benchmarking
- How does the library compare in terms of number of requests and costs per request with other libraries of similar type or size?

Contribution to national overview
- What trends are emerging nationally on the use of electronic resources? How do these relate to statistics on traditional library services, such as number of book issues, number of inter-library loans?

Schufreider found a similar set of reasons given by US libraries taking part in the beta-testing of Scholarly Stats[9], as did the MaxData study of OhioLINK libraries led by Carol Tenopir at the University of Tennessee[10]. While usage statistics alone cannot provide a complete answer to all these questions, they can certainly contribute to any analysis and inform decisions on how results can be presented.

Identifying the source of usage statistics

Publisher or vendor
For serials, databases and e-books, the primary source of usage statistics is the publisher or vendor. These statistics are generally available on a monthly basis from the publisher or vendor website, and currently have to be downloaded by the individual library using passworded access. The arrival of the SUSHI (Standardized Usage Statistics Harvesting Initiative) protocol[11] means that in future it will be possible to retrieve usage reports using an automated process as publishers start to adopt the new standard, which is now a requirement for compliance with COUNTER release 3.

Gateways, hosts and aggregators
If the library gives access to e-serials via a gateway service, such as SwetsWise, or a hosting service, such as Ingenta, then separate usage statistics for this type of access will generally be provided. These will give a record of the volume of usage through the particular service and will need to be added to the statistics downloaded from the publisher to gain a full picture of usage.

   Libraries may choose to get full-text journal titles through aggregator databases such as ProQuest in addition to or in place of direct purchase from publishers. In this case, usage statistics are recorded separately by the database vendor. It is interesting to look separately at such usage, to see how the databases are being used and which full-text titles are popular. It is also useful to add the aggregator usage statistics to those coming directly from the publisher, in order to get a full record of e-journal use. Care must be taken, however, not to include these figures when looking at publisher usage statistics with a view to renewal or assessing value for money of the publisher deal.

Authentication systems

Some libraries have used Athens statistics to show how much usage is coming from a particular source (e.g. on or off the campus) or from a particular group of users. This provides good management information of a type not available from publisher or vendor usage statistics. Its use for this purpose will depend on the way user groups are identified through passwords and on how access through Athens authentication is organized for on-campus and off-campus users. Services such as EZ Proxy[12] can also provide information about on- and off-campus use.

More recent services, such as the bX Recommender Service from Ex Libris[13], provide an illustration of the type of Web 2.0 services that are likely to become more familiar in libraries over the next few years. bX Recommender takes article-level usage statistics from the link resolvers of contributing institutions and offers these to users in subscribing institutions in the form of article recommendations as soon as they log in to the library system.

The move to Shibboleth single sign-on authentication[14] is likely to lead to greater use of the library's e-resources by taking away the need for individual user names and passwords for separate services within the university. It is not yet clear what usage statistics can be provided, or how these will match with publisher usage statistics. Much will depend on how Shibboleth passwords are set up within institutions.

Web-logging software

For gathering information on usage of digital documents produced in-house, on virtual visits or hits on the library website, and on enquiries received electronically, it is necessary to have installed on the relevant servers appropriate web-logging software such as Webtrends[15]. The number of different systems in use, the different ways they might be set up, statistics of on- and off-campus use mean that this type of statistic is not generally a reliable indicator of usage for benchmarking purposes, though it can provide useful background information on usage patterns.

Library management systems and electronic resource management systems

Increasingly, library systems suppliers are providing means of linking directly to electronic resources. Usage statistics from such sources will provide useful guides to the amount of traffic going through the particular route, but will not of course pick up on requests for e-journals or other electronic resources made through Google or Google Scholar, or directly through the publisher or vendor website.

As a further development, electronic resource management systems, working with the SUSHI protocol, will in time be able to gather all e-resource usage data.

Finding consistent and reliable usage statistics

Publisher and vendor usage statistics (supplemented where necessary by gateway or aggregator statistics) are therefore the primary source of usage statistics, although other sources noted above may provide valuable supporting information or provide statistics where no other routes are available. Over the past few years, the COUNTER[16] initiative has been responsible for a great improvement in the quality, reliability and consistency of usage statistics from publishers and other vendors and has made the task of collecting and analysing usage statistics far more straightforward and trustworthy.

COUNTER

COUNTER provides an excellent example of an international co-operative project involving both librarians and publishers and other vendors. COUNTER issued its first Code of Practice for journals and databases in December 2002. Subsequent revisions have introduced new reports and requirements and clarified procedures, and the third Code of Practice was issued in August 2008, for implementation by 31 August 2009. Independent annual audit is now required to ensure that reports and processes conform to COUNTER requirements.

Release 3 requires the implementation of the SUSHI protocol which will allow the automated retrieval of COUNTER usage reports. This link between SUSHI and COUNTER should ensure that publishers

make every effort to comply with the SUSHI protocol within a short space of time. Release 3 also makes separate reporting of use of backfiles or archives a requirement.

COUNTER reports for journals

For journals, the COUNTER Code of Practice release 3 has six reports:

- JR1 – number of successful full-text article requests by month and journal
- JR1A – number of successful full-text article requests by month and journal for a journal archive
- JR2 – number of turnaways
- JR3 – successful item requests and turnaways by month, journal and page type
- JR4 – total searches run by month and service
- JR5 – number of successful full-text article requests by year of publication and journal.

JR2, JR3 and JR4 reports are not mandatory for COUNTER compliance. Vendors are required to offer either JR1A or the new report JR5 in respect of backfile or archive collections.

In the list of COUNTER-compliant vendors for release 2 (dated July 2009)[17] 95 vendors are listed as COUNTER compliant in respect of the JR1 report. This compares to 15 in October 2003 and 38 in May 2005 and demonstrates the continuing success of COUNTER in persuading most of the main e-journal vendors to sign up and be audited for compliance. The work of COUNTER and its widespread acceptance has undoubtedly helped librarians to have greater confidence in serials usage statistics as being comparable across publishers and over time.

COUNTER reports for databases

There are three COUNTER reports for databases:

- DB1 – total searches and sessions by month and database
- DB2 – turnaways by month and database
- DB3 – total searches and sessions by month and service.

There were 22 vendors listed in July 2009 as providing DB1 reports and 43 providing DB3 reports. This compares to 6 and 8 respectively in October 2003 and 12 and 14 in May 2005. Numbers are therefore increasing, though there still remain significant database providers who are not yet supplying COUNTER-compliant reports.

There is a requirement to distinguish in the DB1 and DB3 reports between database searches and sessions involving just one database or set of databases from federated and automated searches and sessions which cover multiple databases from different vendors. Over recent years, the impact of federated and automated searches has led to a vast increase in database usage figures. While a proportion of this may represent genuine cross-searching, much will relate to the automated searching of databases which bear no relevance to the search query. The distinction between these different types of searches is helpful in enabling libraries to get a clear view of searches and sessions relating to a database or set of databases to which they have subscribed. On the other hand, libraries may also wish to keep a record of federated and automated searches to illustrate how widely the library's e-resources are being used.

COUNTER reports for e-books

The first release of the COUNTER code of practice for books and reference works[18] was introduced in March 2006 There are six reports:

- BR1 – number of successful title requests by month and title
- BR2 – number of successful section requests by month and title [a section is defined as a chapter or entry]
- BR3 – turnaways by month and title
- BR4 – turnaways by month and service
- BR5 – total searches and sessions by month and title
- BR6 – total searches and sessions by month and service.

In July 2009, 25 vendors were listed as COUNTER compliant in respect of one or more of the book reports, 15 for BR1 and 13 for BR2[19]. While the e-book market has yet to become as firmly grounded as that for e-journals, it is encouraging to see the number of vendors now included.

Issues in the collection of usage statistics

In spite of the great advances in recent years in the reliability of usage statistics, there remain issues to be resolved. The number of e-mails on UKSG's e-mail list[20] and on the lib-stats list[21] testify to the problems that may be encountered, but also serve as a useful forum for dialogue involving both librarians and publishers at an international level, as a source of advice, information-sharing and problem-solving.

Changing publishers
Tracking titles that change publisher may cause difficulties. The UKSG's Transfer initiative[22] aims to establish a set of standards for transfer of titles and has issued a code of practice to which a number of major publishers have now signed up.

Matching up titles
New titles may be added to a publisher's list in the course of a year, and old titles with only limited volumes available may still appear in usage statistics reports. Usage reports may also include titles which are not available in the deal to which the library subscribes. The number of titles included in usage reports for libraries which have the same deal may vary, and the number of titles listed is likely to be different from those listed as being part of the particular deal the library takes. This may make it difficult for libraries to establish exactly which titles within their usage statistics report they actually have full access to, and in particular to identify among nil-use titles which ones represent genuine nil use.

Dealing with databases
There has been much blurring of the lines between a database and a serials or e-book collection in recent years as more databases include full-text titles in addition to or in place of their traditional abstracts and indexes.

As shown above, databases from COUNTER-compliant vendors provide, where relevant, both JR1 reports on usage of their full-text journals and DB1 and DB3 reports on searches and sessions in the databases themselves. Those that supply e-books also supply BR reports on their e-books. There may well be an element of double counting in respect of the number of titles held, with the same titles being available both within serials collections and databases, such as ABI Inform, etc. The JISC Academic Database Assessment Tool (ADAT) allows comparison of titles held within particular databases or e-book collections[23].

It is therefore important to record usage both of individual items within the database and of the database itself, if a full record of usage is required.

Counting use of e-books
The COUNTER code of practice for books and reference works should over the next few years introduce the same amount of consistency as can now be seen with e-journals. At present, vendors are divided as to whether they can report the number of successful title requests (BR1), the equivalent of a printed book issue figure, or the number of successful section requests (BR2), the equivalent of an article download. This poses problems for libraries in deciding what statistic to collect on a regular basis and how to make comparisons between different services. At the same time, showing trends in use of e-books is important to see what effect this will have in future on other library services.

Analysis of usage statistics

Collecting usage statistics for e-resources (whether nationally for SCONUL or other national library statistics, or locally within the library) is certainly not as straightforward as counting book issues. The process of getting passwords for individual access to publisher websites is time-consuming. Once downloaded, gateway, host and aggregator statistics may have to be added, and the statistics sorted and presented in such a way as to be meaningful to a wider audience. In a report of a survey of research libraries in the US and Canada during 2005, the amount of time libraries spent on collecting and analysing usage statistics varied from one hour a year to 2,080, with an overall median of 98 hours. Generally, more time was spent on collecting the usage statistics than in analysing them.[24]

Although SUSHI may make it easier in future to get access to usage statistics, much manipulation of data still remains to be done by the individual library. Without further analysis, usage statistics on their own have little meaning and certainly cannot be presented in their original format as evidence to stakeholders of the value of investment in a particular publisher deal or e-book package.

Evidence Base has developed an approach to the collection and analysis of usage statistics arising from its work for JISC Collections on the analysis of the NESLi2 deals[25]. They have used this approach with libraries in the 'publisher deal' project[26] and in their work with individual libraries. Usage statistics on their own can illustrate trends over time and patterns of use through the academic year, but for further analysis it is necessary to apply other variables in order to establish performance ratios. The following ideas are suggested:

- *usage range*
  The number of successful requests for each title over a given period can be sorted by usage range, with categories for nil, low, medium, high and very high usage. This makes it possible to show the percentage of total requests falling into each usage range and gives a measure of comparison across libraries and across publisher deals.

  It is recognized that a certain number of titles within a deal receive very high use. This method allows those titles to be identified and also shows what percentage of total requests come from this relatively small percentage of titles.

- *price range*
  Whether subscribing to individual titles or buying into a deal, it is useful to be able to look at the list prices of all titles to which the library has access. Using the publisher list prices, titles within a deal can also be divided into low, medium, high and very high price ranges. The same price ranges should be used across all publisher deals, so that the percentage of high or very high price titles in each can be compared. It is then possible to look for a correlation between journal price and journal use, to see if high-cost titles are used more and low-cost titles used less.

  Publisher price lists are now easier to track down from a central location provided by UKSG, which now lists the URLs for current price lists for over 90 publishers.[27] The information is not, however, provided in a standard format and may not relate to titles available within a particular deal, so that matching prices to titles can be challenging. Ongoing work with ONIX for Serials may lead to improvements.[28]

- *subject category*
  Publisher price lists or other title lists may also include a subject category for each title as assigned by the publisher. It is possible to divide these subject categories into broad areas such as science, technology and medicine (STM) and humanities and social sciences (HSS) in order to analyse the composition of a deal and to look for different usage patterns across the two areas.

  More detailed subject breakdown is also helpful, particularly where the library's budget is devolved to academic schools or departments. In such cases, the subject categories can be allocated to the schools or departments and both usage and costs viewed on a subject basis. This is not an exact science, as subject categories will rarely fit neatly with a particular academic structure and many journals are multi-disciplinary, but it does provide some useful guidance. It would be helpful for this type of

analysis if a universal form of subject category could be applied to all titles rather than having each publisher supply their own.

■ *subscribed titles*
Under the present pricing models, much of the cost of a particular deal goes on maintaining existing subscriptions. Details of subscribed titles are therefore important, whether the library continues to have these in print form or has opted for an e-only package.

Identifying the subscribed titles enables the library both to show how well these are being used (and to identify those with low use) and also to show the extent to which 'non-subscribed' titles are also being used, thus demonstrating the value of subscribing to a deal rather than taking individual subscribed titles. Bucknell[29] gives a description of this approach as used to good effect at the University of Liverpool.

Contextual information

In addition to information relating directly to the journal titles themselves, additional information is needed if key performance indicators are to be derived from the usage statistics.

■ *Costs*
Of all derived ratios, those showing value for money are likely to be of the greatest interest. To establish 'average cost per request', it is necessary to have a complete record of costs of the deal, including the maintenance of subscribed titles. It is possible also to look separately at the costs of subscribed titles, using the subscription costs and any associated e-access fees, and the additional costs of e-access to all other titles included in the deal to break down the 'average cost per request' into 'average cost per subscribed request' and 'average cost per unsubscribed request'. A 'yield per £' can be calculated by comparing the list prices of 'non-subscribed' titles with the additional cost of e-access, showing the amount that is gained for each pound of e-access expenditure. These costs can then be compared with the costs of other methods of document delivery such as inter-library loan or pay-per-view to establish value for money.

Further information on these calculations can be found in the Evidence Base report to JISC Collections on the value of NESLi2 deals.[30]

■ *FTE users*
Usage can also be viewed in relation to the number of full-time equivalent (FTE) users (FTE students and academic staff). While it could be argued that this is not a valid measure, as all FTE users are unlikely to be using the same e-resource, for benchmarking purposes it provides a good point of comparison.

■ *Nil-use titles and availability*
It is a common complaint that the big deal forces libraries to buy titles that they do not need and do not use. A straight reading of usage statistics suggests that it is frequently the case that a large percentage of titles are not used. However, a more detailed analysis of these 'nil-use' titles may show that a significant proportion of them are not actually available in the deal because they have not yet been added or have recently been removed.

In order to arrive at an accurate figure for nil use, those titles included in the list of usage statistics but not included in the deal need to be removed from the analysis. Further examination of remaining titles can then give a truer picture of non-use and will indicate whether there is a real cause for concern.

Where to get help

In addition to the sort of help provided by research and consultancy units such as Evidence Base and the wealth of informal advice offered through e-mail lists such as lis-e-resources and lib-stats, a number of commercial products now exist that will help libraries in the analysis of usage statistics. These include Scholarly Stats[31], Serials Solutions 360 Counter[32] and Thomson Reuters Journal Use Reports.[33]

Contextualizing the data

The type of analysis outlined above enables as much quantitative information as possible to be gleaned from any set of usage data. It does not, however, give any qualitative information in respect of the actual use that students and academic staff are making of the online services in which the library invests so heavily. Who are the actual users? How many of them are undergraduates rather than researchers? If users have downloaded an article, how useful have they found it? In one respect this is no different from knowing when they borrow a book or photocopy a journal article whether they have actually read it or how useful it was. This should not, however, deter libraries from getting behind usage statistics to see what is going on, so that they can understand more about online behaviour. This will help inform strategies for information literacy training, technical support and promotion of services. Decisions on moving to an e-only environment or making print journals less accessible may provide opportunities for exploring the effect on users by focus groups, web surveys or other qualitative research methods. The support from UK higher education libraries to take part in the annual LibQUAL+ surveys[34] demonstrates the importance attached to obtaining qualitative data on library use and possibly, in future, to benchmarking it.

As reported by the Research Information Network (RIN)[35], the deep log analysis approach introduced by the research centre CIBER, based at University College London (UCL), has used raw usage data to provide further information on usage patterns of e-journals within selected research-led universities. The same method is also being used for the analysis of e-book usage for the JISC National E-books Observatory Project[36].

Deep log analysis findings here have been supplemented by qualitative data from case studies and focus groups. Tenopir and King have studied reading patterns among researchers over a 30-year period, and are therefore well placed to track changes in user behaviour since the advent of e-journals.[37]

What next?

While usage statistics may tell us a good deal about what titles are being used, they still leave significant gaps in our knowledge.

What articles are being downloaded?

Within a certain title, certain articles may prove to be more popular than others and may account for a high proportion of total requests. The PIRUS (Publisher and Institutional Usage Statistics) project has established the technical feasibility of obtaining COUNTER-compliant article-level usage statistics to record repository and other online journal article platforms[38] and this will be further developed in PIRUS 2[39]. The establishment of a 'journal article-level report' may then be extended to publisher usage statistics.

While access to journals for which subscriptions have been paid will still be tracked via Google or Google Scholar through authentication systems, direct access to journal articles through repositories or other open access routes may not be recorded. This may in future have a significant effect on overall journal usage.

What is the status of the journal?

Once a deal or an individual title has been purchased, usage statistics provide a good guide to its popularity. However, how do you decide which journals to buy, and if you are an author, which journals to publish in? For researchers, the impact factor (IF) based on the Thomson Reuters Journal Citation Reports[40] is an important consideration. The Journal Usage Factor now under investigation by UKSG[41] will provide a usage rather than citation-based measure.

Who are the users?

As noted above, it is virtually impossible to identify from the usage statistics who the actual users are. It is doubtful whether any authentication system will be able to provide a great level of detail on this, though focus groups or surveys can be used to good effect to establish likely usage patterns.

Conclusion

The emergence of more reliable usage statistics through the work of COUNTER now makes it possible for libraries to take a more systematic approach to their analysis and to build up from this statistical base a clearer picture of online behaviour. A number of initiatives are now looking at various aspects of usage statistics and online behaviour and these are likely to have an impact on our understanding of this area in future.

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