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Impact of library discovery technologies

A report for UKSG

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Executive summary

The primary objective of this research commissioned by UKSG, with Jisc support, was to provide an evaluation of the impact of library discovery technologies on the usage of academic content.

Key findings include:

RDS landscape

- RDS is becoming a major element of the academic library landscape, with 77% of survey respondents having already implemented an RDS at their institution, and a further 11% in the process of doing so, at the time of the survey. Summon, Primo and EDS are the most frequently used, together accounting for over 76% of systems in use.

Libraries

- Increased usage is not the primary motivation for moving to a discovery technology – libraries are more concerned with user experience and providing a single search interface linked to full text. Undergraduate students are seen as the primary users and beneficiaries of library discovery technologies.
- RDS appears to influence content usage, most visibly for e-books. The impact varies by resource, and across libraries.
- Library perceptions of increased usage following RDS implementation are borne out by the usage data. E-book usage appears to have accelerated in the case study libraries following RDS implementation, while e-journal usage have increased just a little or decreased in some instances.
- Database searches can be affected by how the RDS interacts with the multiple databases on some provider platforms, artificially increasing the apparent number of searches recorded. Database results were inconclusive, although there is some indication that the number of searches of some publisher's databases may have fallen following RDS implementation.
- Other factors affecting usage include the link resolver and the options selected when libraries implement the RDS, increase in the volume of subscriptions, growing appetite for electronic content, particularly e-books, promotion of electronic content by libraries and academics, e.g. via reading lists etc.
- High levels of library satisfaction with RDS were reported in the survey and in the case studies. Similarly, user feedback is generally very positive.
- Libraries are unable to see how well their resources match the RDS index, although they believe the match to be 50% or more. There are gaps in the coverage of some collections, particularly Law, owing to the fact that the main publishers and content providers in this discipline do not contribute metadata.
- Only half of the libraries in the survey felt that the content covered in the RDS was provided on a neutral basis but the libraries in the case studies did not rate this as a major concern. Vendor rivalries and concerns over data control are seen as unhelpful by libraries and publishers.
- Libraries do not routinely analyse the usage of RDS

Publishers and content providers

- Visibility of content is a key motivation for publishers to engage with RDS. While libraries generally see an increase in journal downloads following implementation of RDS, the picture for individual publishers is more mixed. Smaller publishers may benefit more from RDS than bigger publishers.
- Some publishers need to do some work to ensure their data are compatible with and optimised for RDS
- Publishers have concerns that they are not being well served by RDS providers who are primarily concerned with their library customers
- Publishers and content providers have no evidence as to whether their usage has been affected by RDS – traffic from RDS seems to remain very low and publishers and content providers cannot always tell from their analytics whether traffic to their site is mediated via an RDS.
- The impact of RDS is diluted by the use of Web-search engines (on a sector-wide scale)

The research found that there is a case for libraries to invest in library discovery technologies, despite some limitations on their ability to exploit the full benefits of discovery technologies. It was also found that there is a case for publishers and others in the academic information chain supply to engage with discovery technologies. To this end, a set of recommendations for the various stakeholder groups has been drawn to best support and advance the discovery of academic information:

Recommendations for libraries

- The library community as a whole should work with bodies such as SCONUL and RLUK, with the support of UKSG and Jisc, to consider ways of:
  - Empowering libraries to drive service development within the RDS community
  - Strengthening the library community voice to ensure that RDS suppliers and content providers are providing end users with the best information discovery experience and that issues such as transparency, neutrality and relevance ranking are dealt with in a way that is acceptable to the community
  - Ensuring that RDS suppliers and content providers are providing content information and usage statistics in a way that enables libraries to fully understand and assess the value of the RDS system and of the resources it indexes
- Libraries should consider the issue of interoperability between products from different vendors, and the long(er)-term risks and benefits associated with moving into a particular vendor's ecosystem, i.e. having a whole suite of products from a single vendor.
  - Making sure libraries have adequate exit strategies
- Libraries should work closely with RDS suppliers and content providers to gain a better mutual understanding of how minor changes in the RDS settings may affect usage of certain resources.

Recommendations for RDS suppliers

- Work towards an open communication with interested parties (libraries and content owners/providers), particularly on the following points

- how individual discovery systems work
- how this can affect the resources of individual publishers/content providers
- how the relevancy ranking is derived
- how metadata are being used in the RDS

- Work with libraries and publishers together to make them understand how RDS settings (customisable by libraries) can affect how some publisher content is surfaced
- Consider user testing for publishers to make sure that their content is surfaced adequately
- Address publicly the issue of vendor neutrality and any potential commercial bias in the indexing of content within the RDS
- Provide libraries with clearer information about what is indexed by the RDS
- Provide the parties involved in RDS with usage reports from RDS (including publishers)
- Consider and act upon the recommendations of ODI and NFAIS
- Support the development of working relationships between competing RDS suppliers with close links with the publishing sector on the issue of disclosure and exchange of data, for the benefit of the RDS customers, and ultimately end-users

Recommendations for publishers and content providers

- Publishers and content providers to work more closely with both libraries and RDS suppliers to make sure the RDS settings are optimised for the discoverability of their content
- Publishers and content providers to request feedback/communication from RDS suppliers

Recommendations for other stakeholders in the information supply chain

Data, activities and initiatives

- UKSG and Jisc to follow closely developments led by COUNTER 4, notably in the area of database usage figures required from content providers from January 2014 onwards to monitor whether this leads to more meaningful database counting
- UKSG and Jisc to encourage initiatives such as KB+ and JUSP to find ways of reporting on usage and content coverage that take account of library usage of RDS suppliers and link resolvers
- COUNTER to consider developing a COUNTER code of practice for RDS usage data.
- COUNTER, NISO, ODI to work together to establish industry standards and encourage RDS suppliers to take notice of those developments

Additional research

- Support further detailed usage research, including:
- a matched control group
- a more extensive dataset (richer data)

- Support new research into the impact of RDS on eBook usage from the publishers' perspective
- Support further detailed research on the impact of library discovery technologies on the usage of databases, particularly A&I databases.
- Support user-based research investigating information seeking behaviours with particular reference to RDS.

1 Introduction

This research was commissioned by UKSG, with the support of Jisc, to assess the impact of library discovery technologies on electronic content usage in the scholarly information community. The work was carried out by LISU and the Centre for Information Management at Loughborough University, in association with Evidence Base at Birmingham City University, with data collected between July and September 2013. The focus of the research is on resource discovery services licensed to libraries (e.g. Summon, Ebsco Discovery Service (EDS), Primo etc.). Google or other search engines are not covered in this study. For the purpose of this research, Abstracting & Indexing (A&I) databases are included in the licensed content to which libraries may subscribe; they are therefore regarded as resource rather than a discovery service per se.

The main aims of the study were:

- to evaluate the impact that library discovery technologies have on the usage of academic resources
- to provide evidence to determine whether there is a case for (a) investment in discovery technologies by libraries and (b) engagement with library discovery technologies by publishers and others in the academic information supply chain
- to provide recommendations for actions that libraries, publishers and others in the academic information supply chain should take to engage with such technologies to best support the discovery of resources for teaching, learning and research
- to identify additional research, data, discussion, initiatives or other activities required that will support the implementation of the findings of this study.

In order to obtain a broad overview of the current position with regard to Resource Discovery Services (RDS) adoption as well as assessing the impact for individual libraries and resource providers, a review of relevant literature, a survey of libraries, and case studies of six libraries and of four resource providers were supplemented by stakeholder interviews, to provide a rounded picture of the impact of resource discovery services on libraries. Analysis of usage data for two years pre- and post- implementation for selected libraries illustrates both the immediate impact and the longer term effects on usage statistics. The methodology is described in more detail in Appendix A.

This report is in five further sections. Section 2 provides an overview of library discovery technologies and the current landscape in UK higher education libraries. Section 3 presents an analysis of usage data from six academic libraries and from four resource providers. Section 4 considers libraries' perceptions and experiences of RDS, while Section 5 examines the providers' point of view. Section 6 includes a set of recommendations for libraries, resource providers, and for further research. Two appendices describe the methodology in detail, and present a summary of the library survey data.

1 Library Discovery technologies

1.1 A brief overview of the role of Resource Discovery Services

The single search approach to discovery is revolutionising the whole HE library experience. Before RDS, users often had to search individual resources independently (OPAC, individual databases, individual collections such as e-books platforms or newspaper collections) to find relevant information on a topic. This was a slow, time-consuming and sometimes labour-intensive process as databases often work differently, i.e. with different controlled vocabulary etc.

Library discovery technologies are changing the way users can search academic resources by offering a one-stop shop. The ubiquity of Google-like search engines has drastically changed the way users of academic resources look for information - and this is maybe particularly noticeable in undergraduate learning, where students do not necessarily require fine-grained information but rather a good overview of a topic (breadth over depth). This change in the way users of academic resources search for information has brought about new forms of discovery layers for academic resources, initially with the introduction of federated search tools, and now with the unified discovery layer.

As RDS or Web Discovery Systems (WDS) become increasingly prevalent, the need to understand their role and impact increases. They represent a considerable investment by institutions and have to be seen to bring added value to the library's presence in the organisation.

There is an increasing trend for users to begin their discovery not on the library website but elsewhere[1,2], probably on Google, Google Scholar, reading lists, Amazon, etc., and to come to the library site to check for a copy if they cannot get hold of it otherwise. The RDS presents a vital opportunity to emulate the web-searching milieu and to wean back the users with the expectation that they will find the majority of their needs in-house. The promise of increased use of library content and systems is attractive to most librarians but also risks the danger that RDS can be seen as a panacea for the increasing flight of users from traditional library tools.

These are still the early days of RDS and concerns from libraries are focussed on selection and implementation, technical services matters, impact on users and a growing need to understand what the use statistics are demonstrating. Is the RDS being used in the manner foreseen? Can libraries begin to predict behaviours so that service delivery can be optimised?

The parties normally involved with RDS are: the end users of the system, the libraries who subscribe to the service; the content owners and providers and the discovery service supplier. The relationship is complicated, as any party may have more than one role, for example, a content provider may also be a discovery service supplier and these issues can add difficulties to the business and contractual relationships.

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1 OCLC (2009) Online catalogs: what users and librarians want. http://www.oclc.org/reports/onlinecatalogs/default.htm

2 Inger, S & Gardner, T (2013). Library technology in content discovery – evidence from a large-scale reader survey. Insights. 26(2) 120-127. http://uksg.metapress.com/content/b771618u5261r434/?p=333af3fb66ad4308b1f1a06f499be3a4&pi=7

The most important issue that arises currently both in the literature and at workshops is that of content, with the emphasis on licensed content and how that is incorporated into the RDS index. Librarians need to juggle between content to which they subscribe from individual publishers as well from aggregators and avoid duplication. The situation varies depending on which RDS is acquired and there is underlying concern about possible commercial bias in promoting proprietary content. Librarians also want to include their institutional online catalogue in the RDS, although this can turn out to be problematic since the catalogue usually lacks full text links and that is no longer what users want. Better access to and exploitation of e-books is also an expectation. A desire to make better use of 'owned' content is also on the wish-list, material in the institutional repository is classically underused and specialised databases such as theses and dissertations and other special collections are often considered for inclusion.

The possibility of all this material being available through a single search box is the major attraction of RDS but it is also where many of the problems congregate. The Google metaphor may be extended to suggest that whilst that search engine is well equipped to retrieve relevant material (principally from websites and some types of documents), a fully loaded RDS may be retrieving full text, metadata only; theses, book reviews, and news stories, with some danger of serious duplication of records. Libraries need to select and customise what is found and a lack of experience with this mixture of resources may well leave users bewildered and confused. Refinement/limitation tools (facets) are there to help navigate to the desired result but this, to some extent, negates the 'single search box' solution.

The professional media report conflicts regarding disclosure between competing content providers which can, at times, result in conspiracy theory paranoia; there are also public exchanges from individual database owners/publishers who have decided not to participate in RDS. In this latter case libraries have to decide whether or not to continue subscribing to specific databases for specialised searching and this has partly led to a perception in academic libraries that the RDS is best targeted at undergraduate students, and that it may not be sufficient for postgraduate and research needs. There is also the fact that some database providers will load the metadata into an RDS but not the full text, which can effectively mean that libraries are paying twice for that content.

For publishers and other content providers, the RDS presents a number of challenges. While keen to contribute content to RDS systems which they see growing in popularity with their customers, and hopeful of seeing usage of their products increase, they may also have concerns on how their titles will appear in the relevancy ranking, whether users will be led to the publisher site or to other sources. They will want to be clear how much of their content will be included, what subject categories will be used, how usage is being recorded, and how customers are being helped to set up the RDS in a way that most effectively displays relevant academic content. Smaller specialist publishers may welcome the greater exposure that the RDS offers, or on the other hand may fear dilution of their content within a wider range of material being returned from a general search term.

Another complication is the relationship between RDS and the link resolvers which actually direct users to the full text once a resource has been identified. The UKSG report on link resolvers and the serials supply chain[3] published in 2007 drew attention to the lack of understanding and co-operation between the various stakeholders in the supply chain, and produced a set of recommendations relating to link resolvers themselves and also to the

[3] http://www.uksg.org/sites/uksg.org/files/uksg_link_resolvers_final_report.pdf

OpenURLs and knowledge bases that are an intrinsic part of them. The UKSG/ NISO[4] KBART[5] initiative has made considerable progress in addressing problems in the OpenURL supply chain, and more recently KB+ has begun the task of creating a shared service knowledge base for UK academic libraries and gaining the co-operation of other stakeholders in this work.

1.2 Recent publications on RDS

There is an extensive literature on various aspects of the introduction of RDS in academic libraries, which has informed this research. Most of the studies are descriptions of the selection, implementation process and initial impact in individual libraries. Some of the key papers are summarised below.

1.2.1 Studies of the implementation of RDS

Many papers have appeared on the selection and implementation of RDS in libraries. One of the most comprehensive and thoughtful is that by Vaughan[6]. A full account is also given of the process of implementing and evaluating Summon at the universities of Huddersfield and Northumbria in the report of a Jisc project in the Enhancing Library Management Systems theme[7] and an increasing number of publications make comparisons between the effectiveness of RDS and other discovery tools.[8]

1.2.2 Studies of the impact of RDS on usage at individual libraries

Way[9] looks at the impact of the implementation of Summon at Grand Valley State University Libraries in 2009 and compares usage of a range of individual resources over a twenty four month period, seeing an overall decline in use of A&I databases and increase in full-text downloads which he attributes to the RDS. O'Hara[10] examines the effect of the implementation of Summon at the University of Manitoba and in studying three years' usage statistics also notes an increase in full-text journal requests.

Lam and Sum[11] in a paper on the experience of RDS at the Open University of Hong Kong (OUHK) describes the setting up of the Primo discovery service in 2012 and compares usage of a range of databases/journals and e-books during the two twelve month periods before and after implementation. They noted an increase in access to full-text content but a decrease in

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4 National Information Standards Organization

5 Knowledge Bases And Related Tools

6 Vaughan, J. (2012) Investigations into library web-scale discovery services. ITAL March 2012 pp.32-82.

7 Thorburn, J., Coates, A. & Stone, G. (2010) Simplifying resource discovery and access in academic libraries: implementing and evaluating Summon at Huddersfield and Northumbria Universities. Available at http://nrl.northumbria.ac.uk/1070/1/JISCSummonCase%20StudyreportFinal.pdf. [accessed 9.10.13]]

8 Asher, D. Duke, L.M. & Wilson, S. (2013) Paths of discovery: comparing the search effectiveness of EBSCO Discovery Service, Summon, Google Scholar and conventional library resources. College and Research Libraries. September 2013 pp.464-487

9 Way, D. (2010) The impact of web-scale discovery on the use of a library collection. Serials Review, volume 36, number 4, pp214-220

10 O'Hara, L. (2012) Collection usage pre- and post-Summon implementation at the University of Manitoba libraries. Evidence based library and information practice, volume 7, no.4 pp25-34. Available at https://ejournals.library.ualberta.ca/index.php/EBLIP/article/view/12166 [accessed 9.10.13]

11 Lam, M. S. & Sum, M. (2013) Enhancing access and usage: the OUHK's experience in resource discovery service. Paper presented at: IFLA World Library and Information Congress, 17 - 23 August 2013, Singapore. Available at http://library.ifla.org/76/1/106-lam-en.pdf [accessed 9.10.13]

platform search statistics, though acknowledged that it was difficult to demonstrate how far this was due to the implementation of the RDS.

A recent presentation from ITHAKA/JSTOR[12] offers a current picture of access to JSTOR from multiple sources. It shows a drop in full text article requests to the database but acknowledges that there were too few responses to be statistically significant. From the perspective of a publisher/content provider the presentation emphasises the need for libraries to give priority to configuring the system at implementation, stresses the importance of subject metadata and asks librarians to consider thoroughly the reasons for implementing and RDS and the methods by which it will be measured and evaluated.

A large-scale comparative study of RDS on online journal usage is currently underway with the participation of 24 academic libraries. Preliminary findings were reported at the Charleston Conference (7 Nov. 2013)[13]. Of the 24 libraries included, 6 employed each one of the top 4 systems (EDS, Primo, Summon, WorldCat Local). The findings to date give a mixed picture of usage, general trends indicating important variations within institutions for both libraries and content providers. Some publishers experienced increased usage while others saw a decrease. The researchers acknowledged that analysing usage statistics is a complex activity and local conditions and context have a major effect on the variables measured. This study continues and further results will be reported at UKSG in April 2014.

1.2.3 Content owners, publishers and other stakeholders

Kelley[14] examines the need for dialogue and collaboration between libraries, content providers and discovery service vendors and cites the work of the NISO ODI initiative *(see Section E),* drawing particular attention to resource coverage and indexing and to issues of transparency, neutrality and relevance ranking. The NFAIS (National Federation of Advanced Information Services), representing abstracting and indexing services, some providing full text, reported a survey of members on their participation in RDS[15]. A survey in 2010 was repeated in 2012 and, while acknowledging some increased usage of their content, it demonstrated increasing levels of uncertainty and negativity in the answers to many questions, e.g., decrease in revenue, brand identification loss and some concern about inaccurate usage statistics.

1.2.4 Non-contributing content owners/publishers

As the studies above have mentioned, there are some publishers who do not contribute all their content to RDS. One of these publishers is the American Psychological Society (APA), who in a statement on participation in discovery services issued in 2011, explained this decision on the grounds that researchers and students searching an RDS will miss a high proportion of the

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[12] CSI: discovery (2013). Available at http://ithaka.org/sites/default/files/files/Heterick.pdf [accessed 28.11.13]

[13] Levine-Clark, Michael, John McDonald, and Jason Price, "Discovery or Displacement?: A Large Scale Longitudinal Study of the Effect of Discovery Systems on Online Journal Usage," Charleston Conference, November 7, 2013. Available at http://www.slideshare.net/MichaelLevineClark/mlc-jdm-jsp-charleston-2013-slideshare-28161600 [accessed 23.11.13]

[14] Kelley, M. (2012) Web-scale discovery services face growing need for best practices. Library journal, October 15, pp34-40. Available at http://www.ebscohost.com/uploads/newsroom/docs/Web-Scale_Discovery_Services_-_Coming_Into_Focus_-_Library_Journal.pdf [Accessed 9.10.13]

[15] NFAIS (n.d.) Survey comparisons on discovery service participation and perceptions: 2010 and 2012. Available at: http://info.nfais.org/info/Survey_2010_2012_Comp.pdf

content included in PsychINFO® and will not have access to its refined search system[16]. Metadata are currently included in the indexes of four of the discovery services (Primo, EDS, Summon and WorldCat Local) only for selected APA databases, e.g. PsycARTICLES®, PsycBOOKS®, and PsycCRITIQUES®.

1.2.5 Agreeing standards and best practices

The Open Discovery Initiative (ODI)[17] was set up within NISO with the aim of defining standards and/or best practices for resource discovery services. The working group hopes to establish a more standard set of practices for content representation and for interactions between information providers and RDS suppliers.

In a large scale survey of librarians, content providers and RDS suppliers in the US and the UK[18], the ODI gathered a good deal of information on issues relating to RDS which is intended to inform a set of recommendations. Responses were received from 871 participants, 782 librarians, 74 publishers and 15 discovery service providers. This seems like an excellent response from all sectors but in the case of the librarians it may not be fully representative as it is likely to have been a self-selecting sample of those librarians who already had an RDS (74%) or were planning to implement one (17%). The survey asked questions about what level of information unit librarians wished to see in their RDS and the type of information that was important to them, with title information scoring highest (84%). The librarians' desired metrics were: total number of searches; list of search query terms; and URLs referring end users into the discovery service.

Content providers showed a mixed response when asked if they contributed their data for indexing in RDS: 44% stated all data was indexed, 48% said 'some' and 8% answered in the negative. The 15 discovery service providers reported that the quality and level of metadata delivered from the content providers had a major effect on what was delivered after searching. The study gives a snapshot answer to several important questions on RDS but did not gather extensive data on many of the acknowledged issues discussed above.

In October 2013, ODI published a document of recommended practice for discussion and comment.[19] The intention is to develop good practice in the areas of technical formats, communication of libraries' rights, level of indexing, fair linking and usage statistics. The document offers a strong set of recommendations for content providers and discovery service providers in their interaction with libraries and with each other. Suggestions for appropriate levels of metadata, protocols for fair linking from content and for clearer metrics between all groups are set out. The recommendations address most of the issues raised in this study but as the final date for comment was November 18, 2013 it was not possible to report the outcomes here.

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16 http://www.apa.org/pubs/databases/news/2011/08/discovery-services.aspx [accessed 9.10.13]

17 http://www.niso.org/workrooms/odi [accessed 9.10.13]

18 National Information Standards Organization (2013), ODI survey report: reflections and perspectives on discovery services. Available at: http://www.niso.org/apps/group_public/download.php/9977/NISO%20ODI%20Survey%20Report%20Final.pdf [accessed 9.10.13]

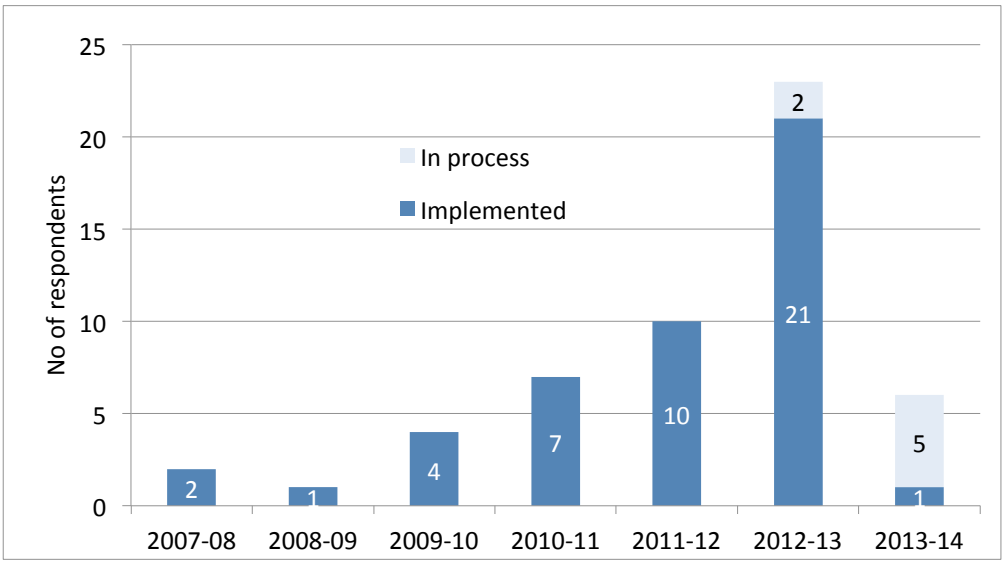
19 National Information Standards Organization (2013), Open discovery initiative: promoting transparency in discovery. Available at: http://www.niso.org/apps/group_public/document.php?document_id=11606

In a similar vein, NFAIS published a set of recommended practices for discovery services on 30 August 2013.[20] Written from the perspective of the content owners it sets out a list of 18 'rights and obligations' for content owners, platforms, discovery services, subscribers and users.

1.3 Current RDS landscape in UK HE libraries

One purpose of our initial survey was to establish the extent to which RDS was being adopted in UK academic libraries. Unsurprisingly given the nature of the survey – which may have resulted in a self-selection bias - a large majority of the 62 respondents (77.4%) were already using an RDS at their institution and just over 11% of respondents were in the process of implementing one, at the time of the survey. Early adopters of RDS implemented it back in 2007-08, when federated search tools were just starting to be criticised, mainly because of their slow return of results. The survey findings suggested that RDS implementation in HE libraries may have reached its peak in the last 12 months. Indeed, there were as many implementations done in 2012-13 as in the last three years (2009-2012) *(Figure 1)*.

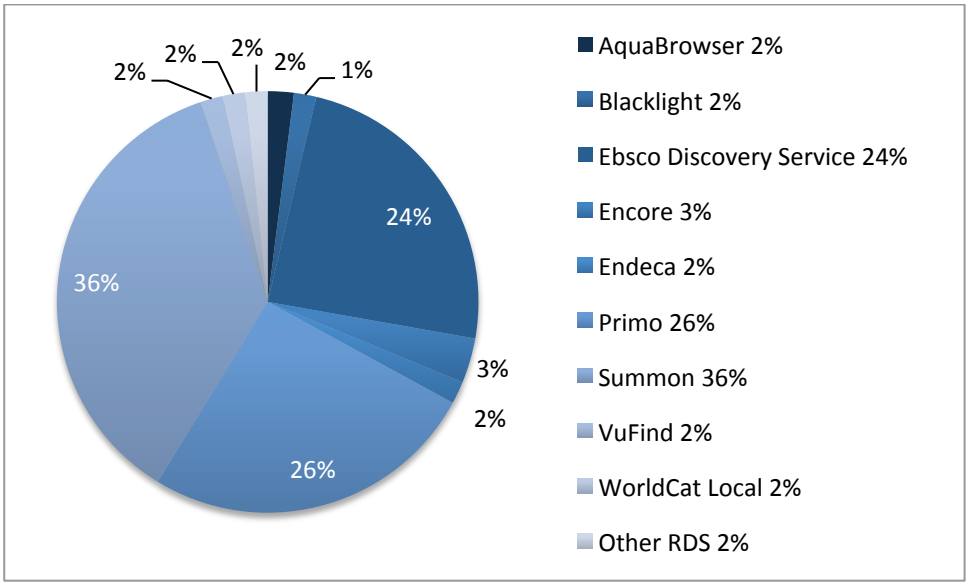
Figure 1 RDS use in academic libraries



The UK HE RDS market is mainly covered by three products: Ebsco's EDS, Ex-Libris' Primo and Serials Solutions' Summon *(Figure 2)*. Almost half of all respondents (25 out of 54) considered the RDS to be a replacement for their previous online catalogue, but only 14 (out of 54) no longer offer access to the catalogue. In the library case studies, librarians had very mixed views about whether they considered their RDS to be a replacement for their catalogue. It was often reported that access to the catalogue was still required for transactions such as book reservations, as this was not possible from within the RDS system.

[20] NFAIS (2013), Recommended practices: discovery services. Available at: http://info.nfais.org/info/Recommended_Practices_Final_Aug_2013.pdf

Figure 2 RDS products used by UK HE libraries



2 Libraries and usage statistics

2.1 Usage data collected

The survey findings indicated that libraries record a variety of statistical data on the usage of resources discovered via the RDS, predominantly searches, full text downloads and hits *(Figure 3).* Most libraries reported using the COUNTER reports for journals (JR), e-books (BR) and databases (DB) *(Figure 4).* Other statistical data used by survey respondents included non-COUNTER vendor reports, statistics from individual data providers, local intranet statistics etc. Just under half of the libraries reported collecting usage data in relation to category groups via Athens, Shibboleth or EZProxy log-ins. Three libraries were using RAPTOR for analysing category groups, and five others were planning to do so in the future.

Figure 3 Statistical data collected by library

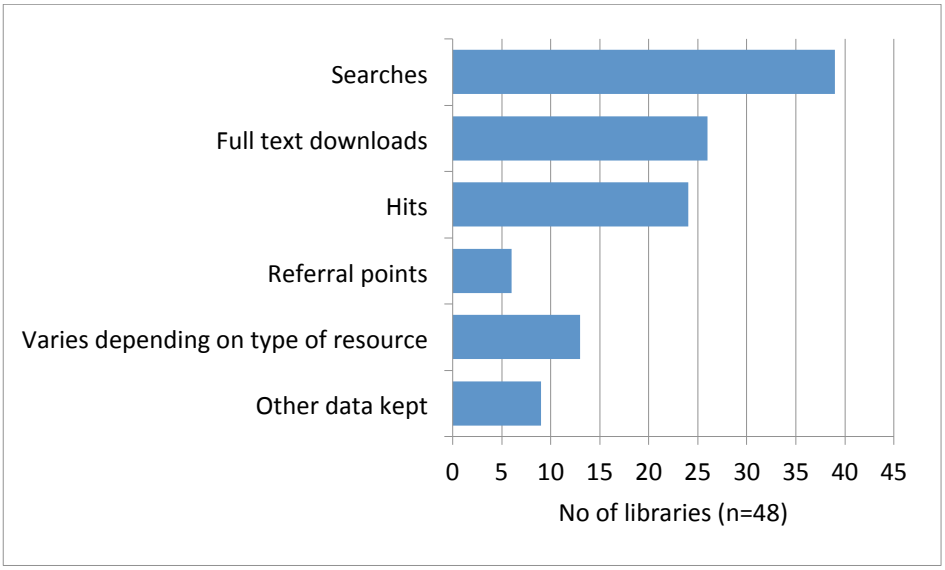
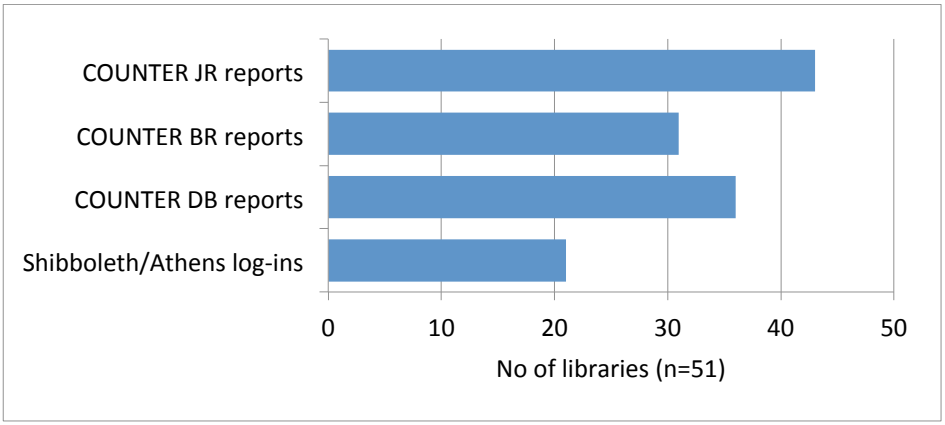


Figure 4 Use of major sources of usage data



In the survey, 31 libraries (out of 54) reported using analytic software to analyse their usage data. Eighteen used Google analytics, 13 used the tools built into the RDS, while three used Excel and five mentioned the Journal Usage Statistics Portal (JUSP). Only three libraries reported regularly comparing trends in data relating to usage of the RDS with sources showing

actual usage of the target resources themselves, although 30 (out of 52) did so occasionally. Ten libraries said they never made such comparisons.

Some case study libraries did not think that search or session-type data were particularly meaningful since RDS tended to search across almost all databases for everything the searcher keyed in. Libraries indicated that what they really wanted to know is how many of the results returned proved useful. In other words, libraries thought that indicators that users are actually interacting with the resource would be useful metrics for them. This can be captured through record views and ultimately through clicks-through to the full text download, although one cannot be sure that a paper that is downloaded is actually read. Several libraries also indicated an interest in getting a user profile for their resources - for instance, how much usage of a resource is coming from undergraduates etc. It was thought that such a level of granularity was not completely out of reach in the near future, if it was possible to have a single sign-on between the RDS and Shibboleth or similar federated identity access management systems and to extract such information using tools such as RAPTOR.

> "We don't use the full potential of Google analytics as it is difficult to get to grips with."
> (Survey respondent)

2.2 Usage data analysis

Usage data were received from six case study libraries, and from four publishers. Individual libraries and publishers have been anonymised in the analysis and discussion in this report. Time series techniques were used to analyse the trends in usage, and data referred to the month of implementation of the RDS in each library to facilitate comparison. As far as possible, the data presented here are based on a constant set of resources, to reduce the effects of growing collection size over the periods covered. Further details are given in Appendix A.

2.2.1 Electronic journals

JR1 data were received from all libraries and all publishers.

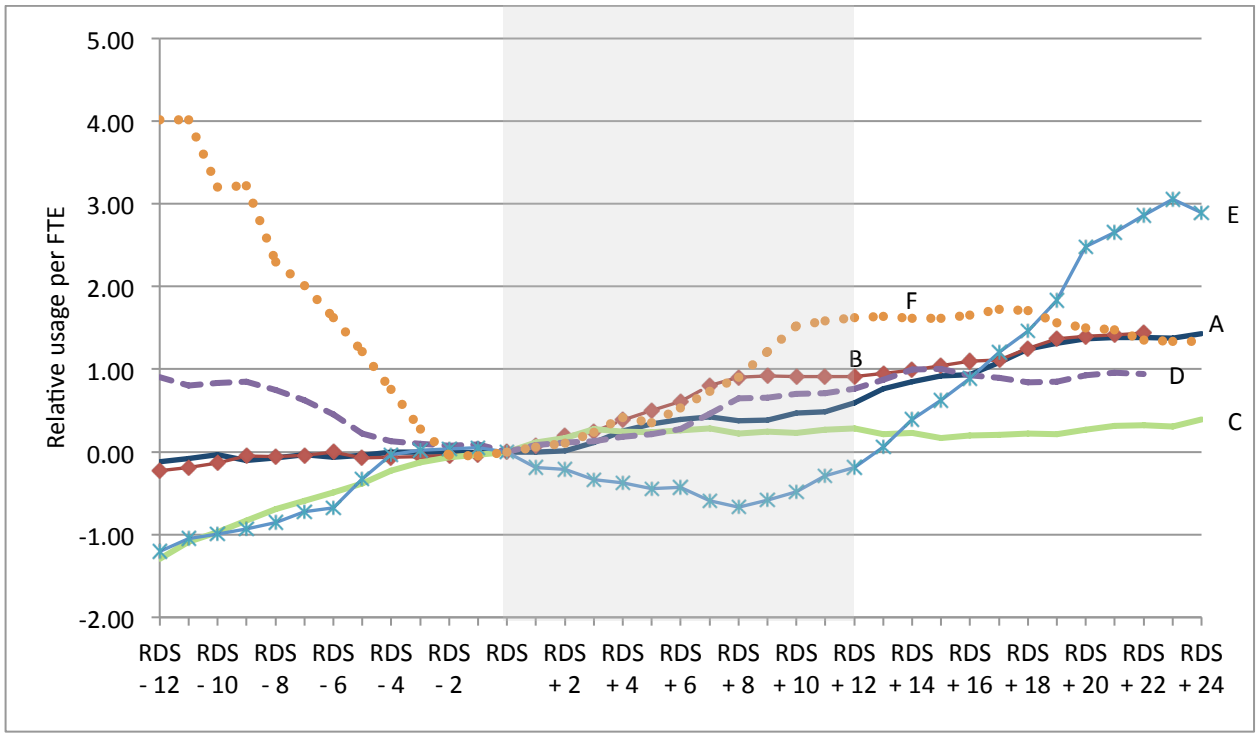
Figure 5 shows the trend in journal usage per FTE, relative to the introduction of the RDS in each of the six participating libraries.

- In the year immediately prior to the introduction of RDS, two libraries (D and F) reported declining journal usage per FTE, with a particularly steep decline at library F. Library A reported fairly steady usage, while libraries C and E reported steady increases.
- In the first year post-implementation, Libraries C and E reported stable levels of usage per FTE, while libraries A, D and F reported increasing usage to a greater or lesser extent.
- In the second year, two libraries (A and F) continued to report steady increases in usage per FTE student, while in two libraries (C and D) usage appears to have stabilised. In the case of library C, this is at a higher level than at the start of the three-year period. Library E, however, has reported significant increases in usage per FTE student.

Library A indicated that they believed the implementation of their RDS had made a difference in journal usage. They indicated that they had observed a steady increase of JR1 activity over the past 10 years and they had expected to see the trend plateauing out at the time of the implementation of the RDS, as they commented "there is only so much the users can consume". However, they reported an unexpected 17.5% increase in their JR1 activity in the

year following the implementation of the RDS. They also commented that this positive impact of RDS on journal usage could also be seen in the cost per download of a dozen of their core services (accounting for 74% of their JR1 activity) which went down by 19% in the second year after implementation of the RDS due to this increase in usage.

Figure 5 Overall journal usage



Four out of the six participating publishers provided JR1 data, which makes it possible to look at the trends over the period for the four publishers. It is normal to observe different trends between publishers as our case study institutions differ in the subjects they offer and in the degree to which they are involved in research. Those two elements have an important impact on content usage for the pool of publishers participating in this study.

Figure 6 shows the trend in journal usage per FTE, relative to the introduction of the RDS in all six participating libraries, based on data received from publisher W. The most notable differences from the overall totals are the pre-implementation trend for library F, and the dip in usage at library C initially following implementation.

Libraries A and E initially showed a decline in usage of Publisher W's titles following implementation of their RDS, but in both cases this was reversed in the second year after implementation, with usage at library E showing an above-average increase in the second year. Library A indicated that the slight upward trend in the second year would probably not have been maintained without Publisher W's titles being indexed in their RDS, which resulted in over 18,000 links out to full text, about 8% of Publisher W's JR1s in the first year following the implementation of the RDS, and about 13% of JR1s in the second year. At library C, where usage of publisher W's titles was increasing before implementation of the RDS, usage began to fall during the first year after implementation, and only began to rise again towards the end of the second year. At libraries B, D and F, usage increased steadily, to varying degrees, in the first year following implementation of the RDS; the rise has continued into the second year for

library B. However, it was later established by library B that the increase in journal usage may be the result of a new journal package subscription with Publisher W, which increased the overall total number of journals from 70 to 1800 titles; consequently, the impact of the RDS on journal usage from Publisher W may not be as important as the graph at first suggests.

Figure 6 Journal usage – Publisher W

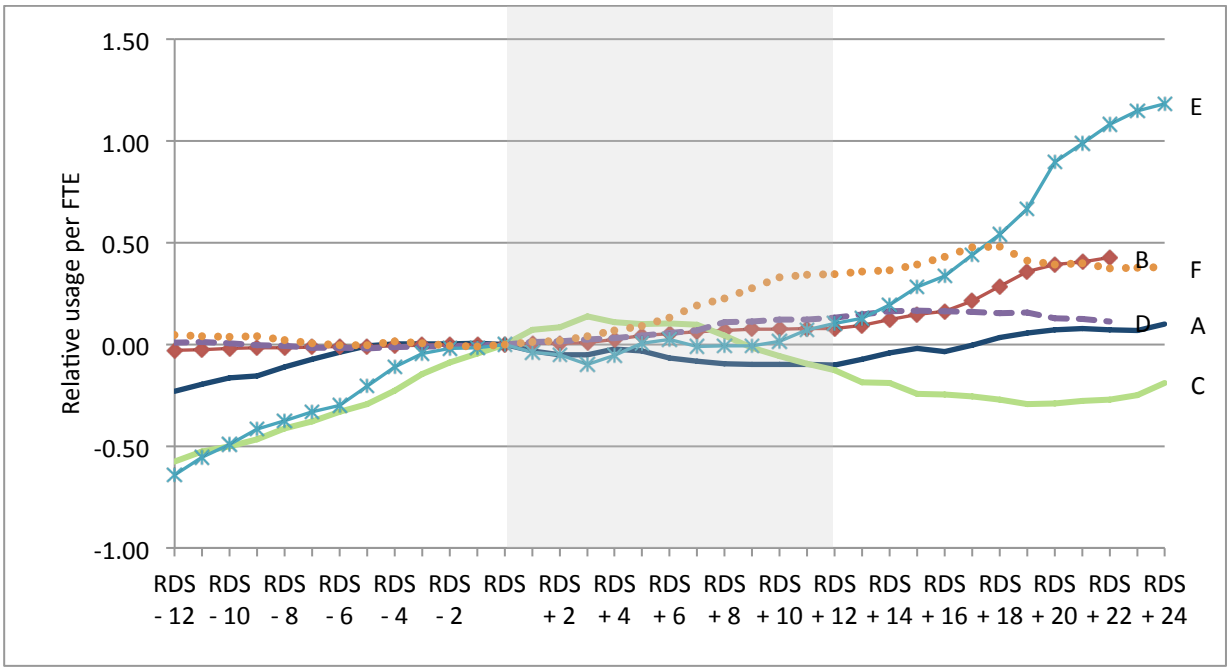


Figure 7 shows the trends in journal usage per FTE, relative to the introduction of the RDS in all six participating libraries, based on data received from publisher X. While Publisher X's title usage at libraries A, C, D, E and F decreased or stayed about the same after implementation of the RDS, usage of Publisher X's titles increased significantly at library B immediately after the implementation of the RDS and started to decrease in the second half of the second year, with usage levels still at a higher level than the five other libraries.

Figure 7 Journal usage – Publisher X

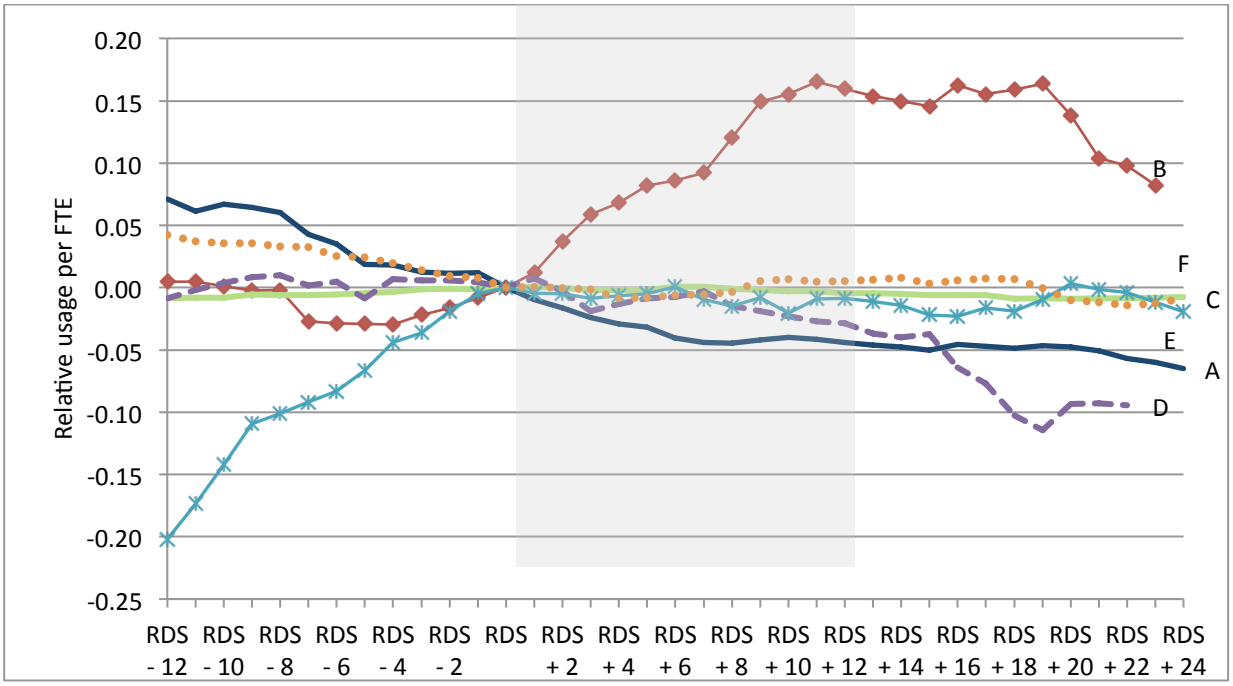


Figure 8 shows the trends in journal usage per 1,000 FTE, relative to the introduction of the RDS in four of the six participating libraries, based on data received from publisher Y, a small specialist publisher. Interpretation of the usage data is complicated by the extreme variation in usage caused by the small size of publisher Y. Overall publisher Y's title usage has fallen at libraries A and C in the two years following implementation. Library E saw usage of publisher Y's titles decrease significantly in the first eight months following implementation, however, since then usage has increased overall so that it is now at a higher level than at the start of the three year period. Library F is the only library to see usage of publisher Y's titles increase overall in the two years following implementation.

Figure 8 Journal usage – Publisher Y

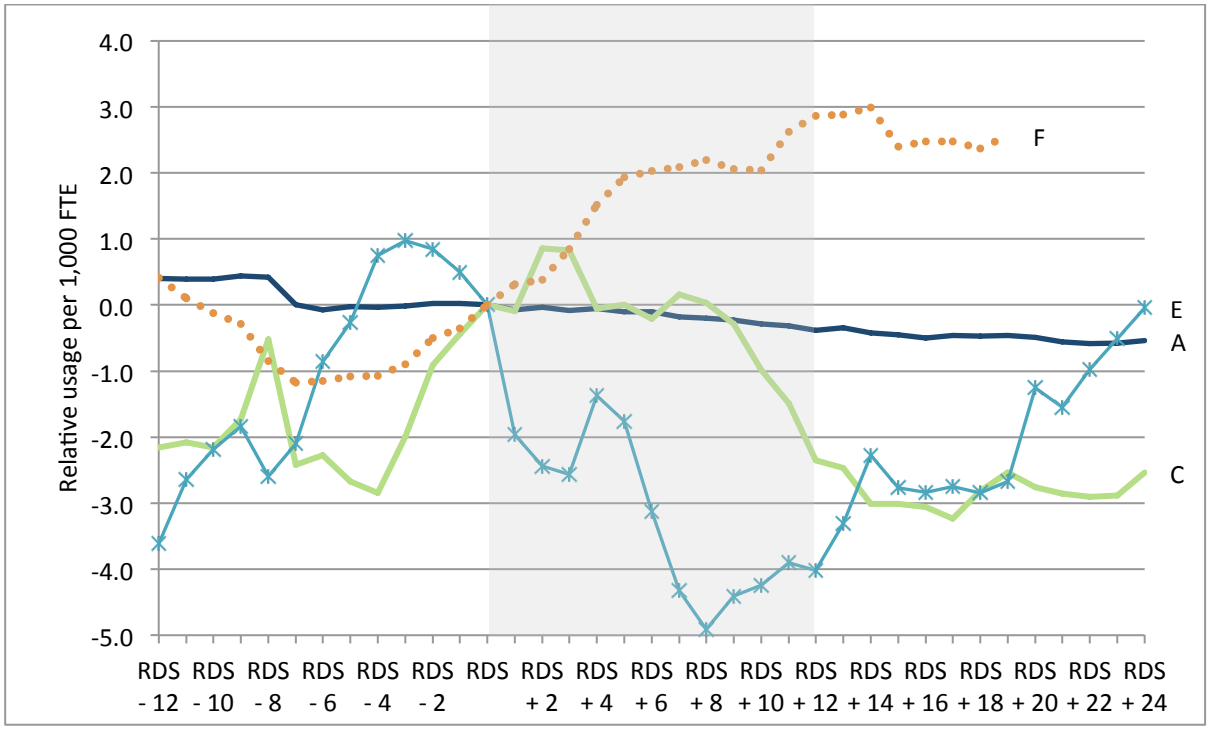
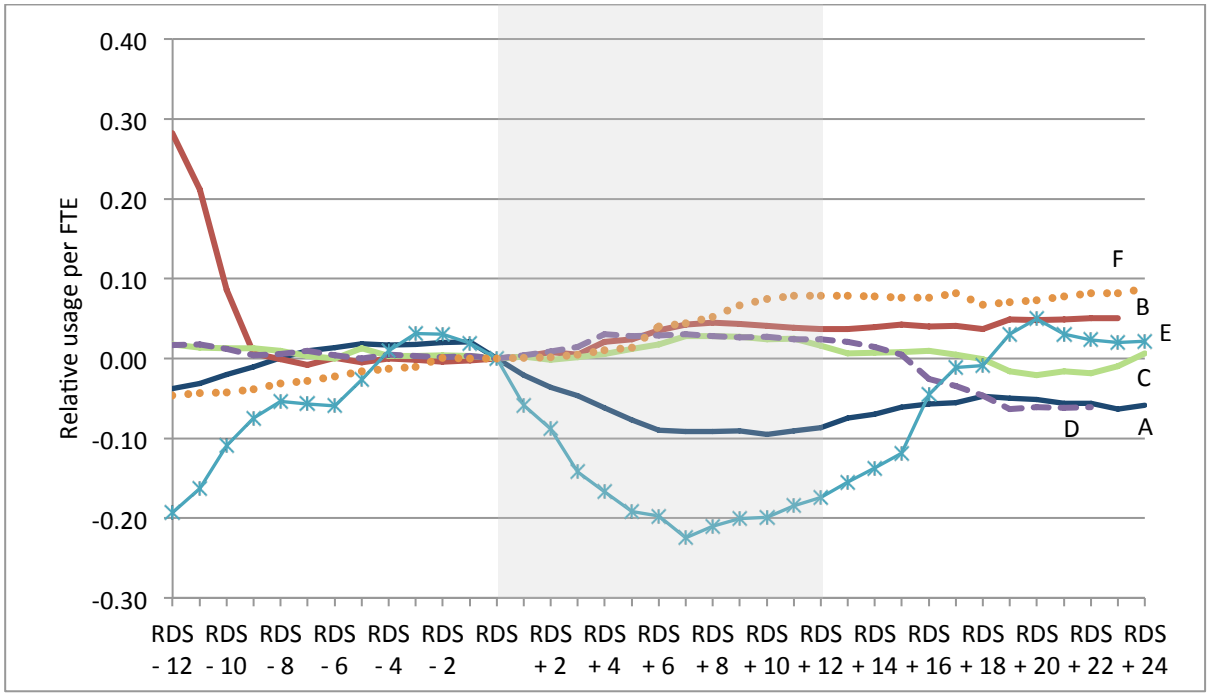


Figure 9 shows the trend in journal usage per FTE student, relative to the introduction of the RDS in all six participating libraries, based on data received from publisher Z. Publisher Z's usage had increased at library E before the implementation of the RDS and usage suddenly dropped immediately after the implementation of the RDS before beginning to increase again in the second half of the first year after implementation. Similarly, library A also saw usage of publisher Z's titles decrease in the first year following implementation, before increasing slightly during the second year; however, relative usage remains slightly lower than at the start of the three-year period. Usage at Libraries C and D first increased after implementation of the RDS and was then marked by the slight decrease. Usage at libraries B and F increased slowly but steadily in the two years after implementation of the RDS.

Figure 9 Journal usage – Publisher Z



The interpretation of the usage data for these four publishers is a complex matter, as there may be other factors influencing usage levels – e.g. change of platform, or a change of collection subscribed to affecting the number of titles. What we can say is that the usage of journal titles amongst the four participating publishers has been affected differently after implementation of the RDS, and not all publishers have been affected in the same way, nor is the usage between libraries similar.

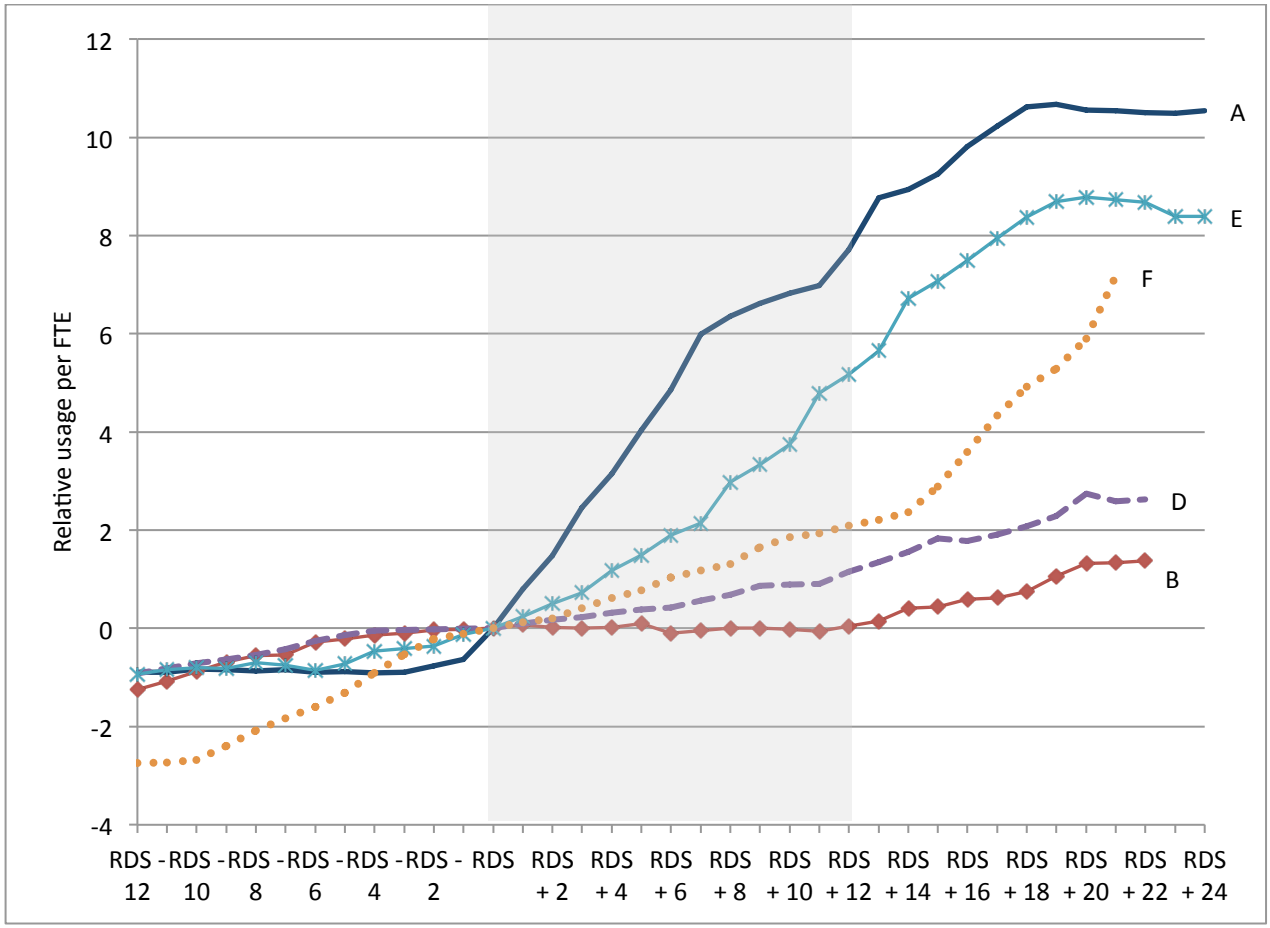
2.2.2 E-books

BR2 data were received from four libraries and three publishers, however only one publisher showed regular use of its titles (at 4 of the 6 libraries).

Figure 10 shows the trend in e-book usage per FTE, relative to the introduction of the RDS in each of the four participating libraries.

- Library F saw e-book usage increase rapidly in the year prior to implementation, albeit from a lower base than the other three libraries. Usage grew steadily in the year following the implementation of the RDS and increased significantly in the second year after implementation.
- In the year immediately prior to implementation libraries B and D also recorded an increase in e-book usage and this has continued in the two years since to a greater or lesser extent.
- By contrast, e-book usage seems to have stabilised at library A in the year prior to implementation. However, the two years since then have seen e-book usage per FTE student increase significantly.

Figure 10 Overall e-books usage



Although three publishers provided data on e-book usage for four of the case study libraries none are major suppliers of e books (at least, not at our case study libraries). These figures are not, therefore, presented here.

2.2.3 Databases

DB1 data were received from five of the six case study libraries, while one publisher supplied DB3 data from 2010. DB data from publishers related mainly to full-text databases, whilst the overall DB1 data from libraries covers all different types of database, including full-text and A&I. DB3 data are database reports providing the total number of searches and sessions by month and service while DB1 data provide the total number of searches and sessions by month and database.

Figure 11 shows the trend in database searches per FTE, relative to the introduction of the RDS in each of the five participating libraries.

- Library E reported some exceptionally high figures following implementation of its RDS, even based on a constant set of resources, with usage having increased, on average, by some 250 searches per student per month two years after the implementation on their RDS. Closer examination of the data suggested that a suite of databases from one supplier was being searched in parallel, potentially multiple-counting the actual number of searches taking place. Library E's data have not been considered further in this

section. Library F had noted a similar effect in their database searches, and routinely adjusted their data to take account of this.

- In the year prior to the implementation of their RDS, libraries B, C and D show an increase in the usage of their subscribed databases to varying extent. On the other hand, a steep decrease in database usage was observed at library F in the later part of the year immediately preceding the implementation of the RDS.
- In the first year following the implementation of their RDS, usage at the four libraries (B, C, D and F) is extremely varied. Usage at library D is dropping while usage at libraries B and C is decreasing slightly. On the other hand usage at library F in the first year after implementation is increasing significantly, although the level remains lower than at the start of the three-year period.
- In the second year following the implementation library D continues to record a fall in database usage, at a faster pace than the previous 12-months. Library F also records a fall in usage in the second year post-implementation, although the level remains higher than it was at the introduction of the RDS. Library C reports fairly steady usage throughout the second year post-implementation. Library B has recorded an increase in usage in the second half of the year.

Figure 11 Overall database usage

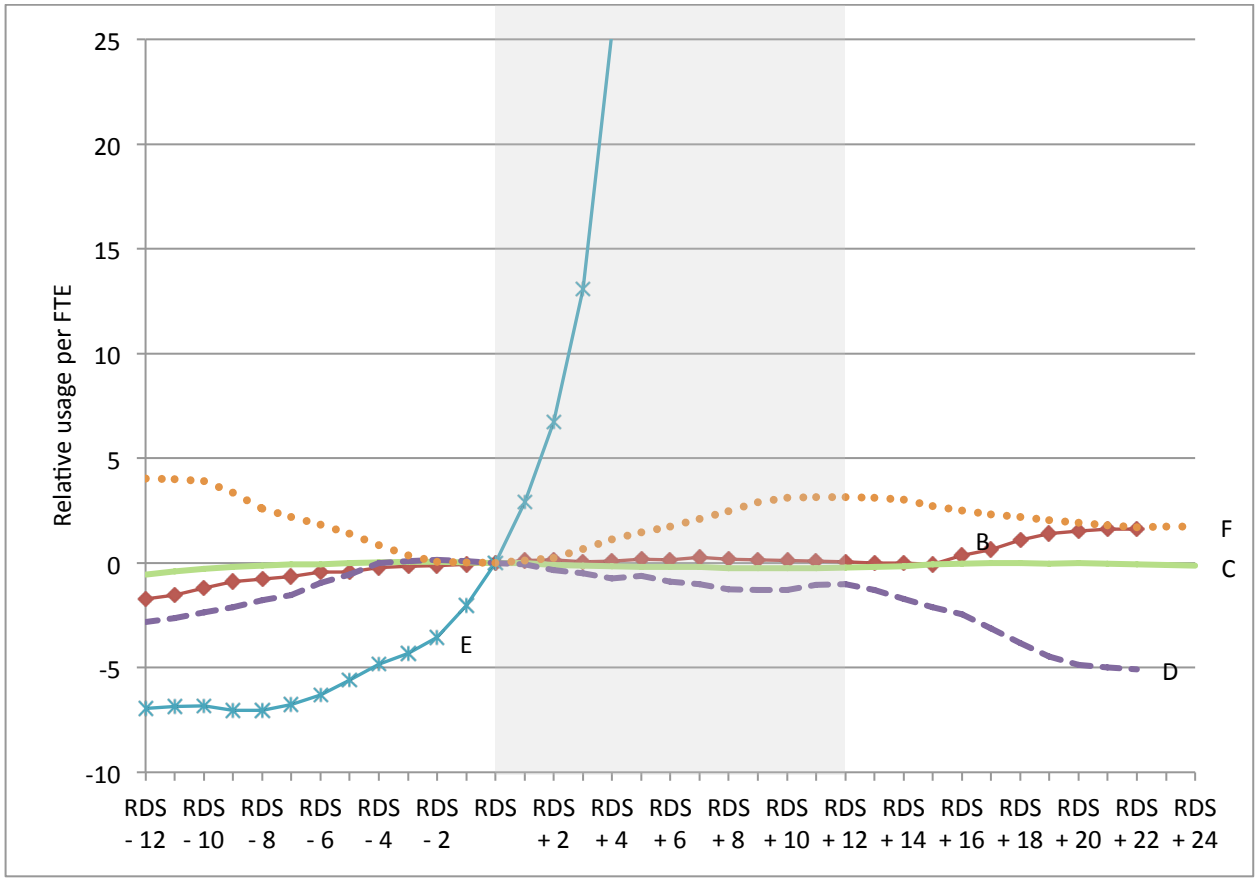


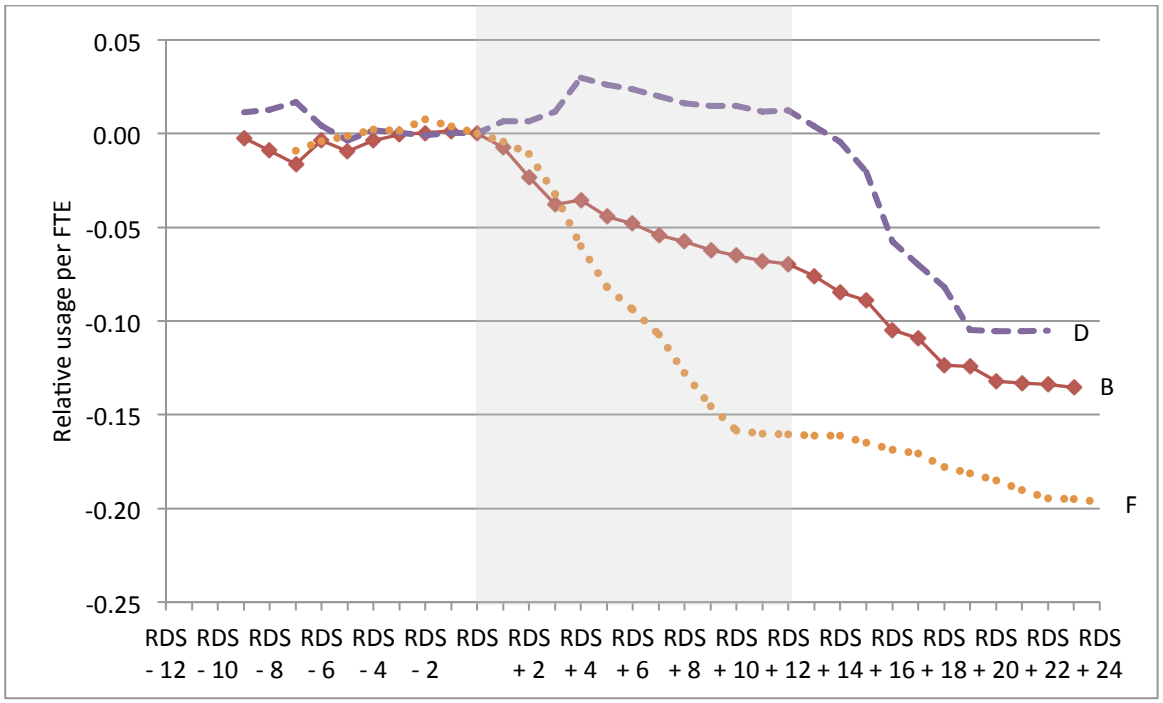
Figure 12 shows the trend in database usage per FTE, relative to the introduction of the RDS in three of the six participating libraries, based on data received from publisher Z. Usage data for libraries A and C began after the implementation of their RDS, so that no relative figures could be calculated. Reported usage at library E showed three months of exceptionally high activity,

with a more than ten-fold increase in the number of searches compared to the rest of the data set. Because of this unusual pattern, library E has also been omitted from this analysis.

Database usage data from Publisher Z show that usage at libraries B and F decreased significantly immediately after the implementation of the RDS at those libraries; the decrease was more marked for library B than for library F. On the other hand, a slight increase in database usage was reported at library D in the first year, but usage levels post implementation dropped significantly in the second year.

With regard to database access, library A (who were unable to provide detailed usage data) commented that what was important was where the actual search was happening, i.e. where the full text request originated. They explained that since the implementation of their RDS there had been a shift away from direct database access, with the number of accesses from within RDS user sessions increasing by 88% in the year following the implementation of the RDS and a further 15% in the second year after implementation. In the interviews, other libraries had suggested direct database access was replaced by RDS mediated full text access.

Figure 12 Close-up view of database usage for libraries B, D, F



2.2.4 Limitations of the usage data analysis

It is important to note that the results from the usage data analysis presented above should be interpreted with extreme caution for the following reasons:

- The analysis is based on a small sample of HE libraries, chosen for their ability to provide the necessary data, and to give a spread of institution types and sizes. Six library data sets do not provide a reliable sample size for extrapolating results to the whole sector. However, where there are commonalities, it might be inferred that these are found more widely in the HE library community.
- Furthermore, libraries were requested to provide monthly aggregated figures for JR1, BR2 and DB1. Although some libraries provided us with more detail, the resources

available for this project did not allow the research team to dig more deeply into the data provided, nor was it possible to ask libraries for additional data. The research would have certainly benefited from some more detailed evaluation.

- The sample of publishers is also small and although all four publishers who provided data produced JR1 reports, the number who also had database and e-book reports was more limited. Several reasons could be given for the slow release or non-release of the data, and possibly the most important being the sensitive and commercial nature of the data. Other reasons included the difficulty of retrieving archived data for the early years of the period studied; the publisher changing platforms over the period, which would have had an impact on the data collection; the fact that COUNTER compliance only required publishers to store and provide two years of usage data at any time; etc.
- The analysis of content usage is multi-dimensional and subject to a great number of variables, the majority of which are beyond the scope of basic usage statistics to reveal. As a consequence, there is a lot of noise in the results and it is difficult to isolate the sole effect of RDS on content usage without looking at a sample of specific resources in great detail, which was not possible within the resources available.

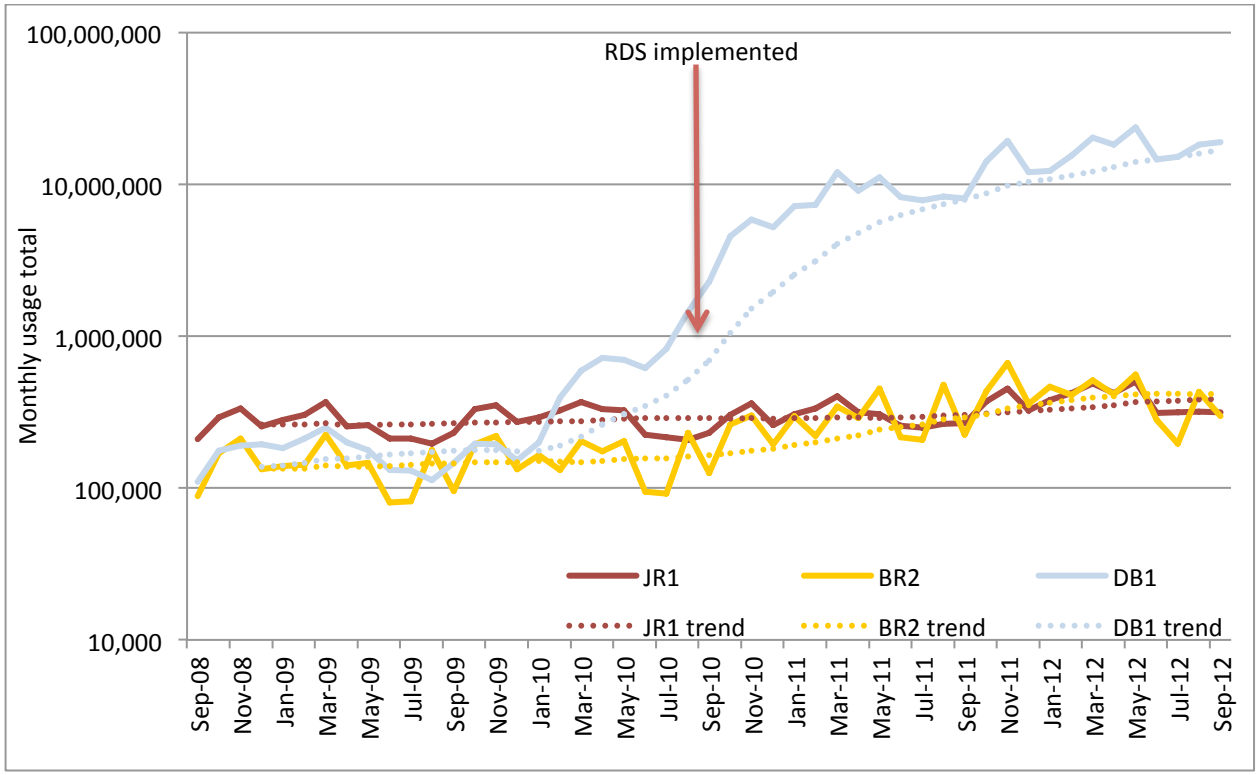
2.3 Usage data case studies

The broad analyses above illustrate some of the difficulties in presenting analysis of aggregated data, and that there is considerable variation between libraries and between providers in the impact of RDS on e-resource usage. In order to investigate some of these issues in more depth, two more detailed case studies are presented below; one from a research intensive university, and one from a teaching-led university. Libraries E and F were selected as having provided the most comprehensive data sets, and presenting contrasting picture of use.

2.3.1 Library E

University E implemented their RDS in September 2010. Figure 13 summarises the total usage data received from Library E for two years before and after implementation. Figures are based on journal article downloads (COUNTER JR1 or equivalent); e-book section requests (COUNTER BR2 or equivalent; and database searches (COUNTER DB1 or equivalent), and includes all resources. There is considerable variation from month to month across the year, reflecting increased student usage during term time, and the broad trends are also shown. All subsequent analyses have been carried out using these trend figures.

Figure 13 Overall time series



Note the logarithmic scale on this graph.

From these data it appears that the implementation of the RDS has impacted on usage of electronic resources, particularly databases and e-books. Other factors also impact on usage, however, most notably the availability of resources.

In the survey, Library E felt that content usage "fell a little" immediately after implementation but increased in the long term, and the usage data suggest that this was indeed the case for journal downloads, and some databases. An explanation offered was the possibility that there was a brief period of confusion and annoyance amongst existing users, who had got used to using the previous service, navigating their way to individual databases. Introduction of the RDS coincided with other changes, including a re-design of the library webpages, but as users became familiar with the RDS and the new intake arrived, usage increased.

Journals

Figure 14 shows the relative usage per FTE student compared to the month of implementation of the RDS for all reported usage, for a subset of 62 resources which had recorded usage across the full four year period ("constant titles" in the legend), and for data as supplied by the four publishers participating in the study. In the year before implementation of the RDS, journal usage generally was increasing at Library E. In the first year after implementation, usage based on a constant set of titles initially fell, but subsequently recovered. In the second year, however, usage has again increased, both overall and for Publisher W. Publishers X, Y and Z record lower usage levels overall, and Figure 15 shows the detail for these three publishers.

Overall, two years after the implementation of its RDS, journal usage at library E had increased by almost three downloads per FTE student per month based on a constant set of resources, with a further 2.5 downloads per FTE per month coming from newly subscribed content.

Figure 14 Relative usage per FTE - journals

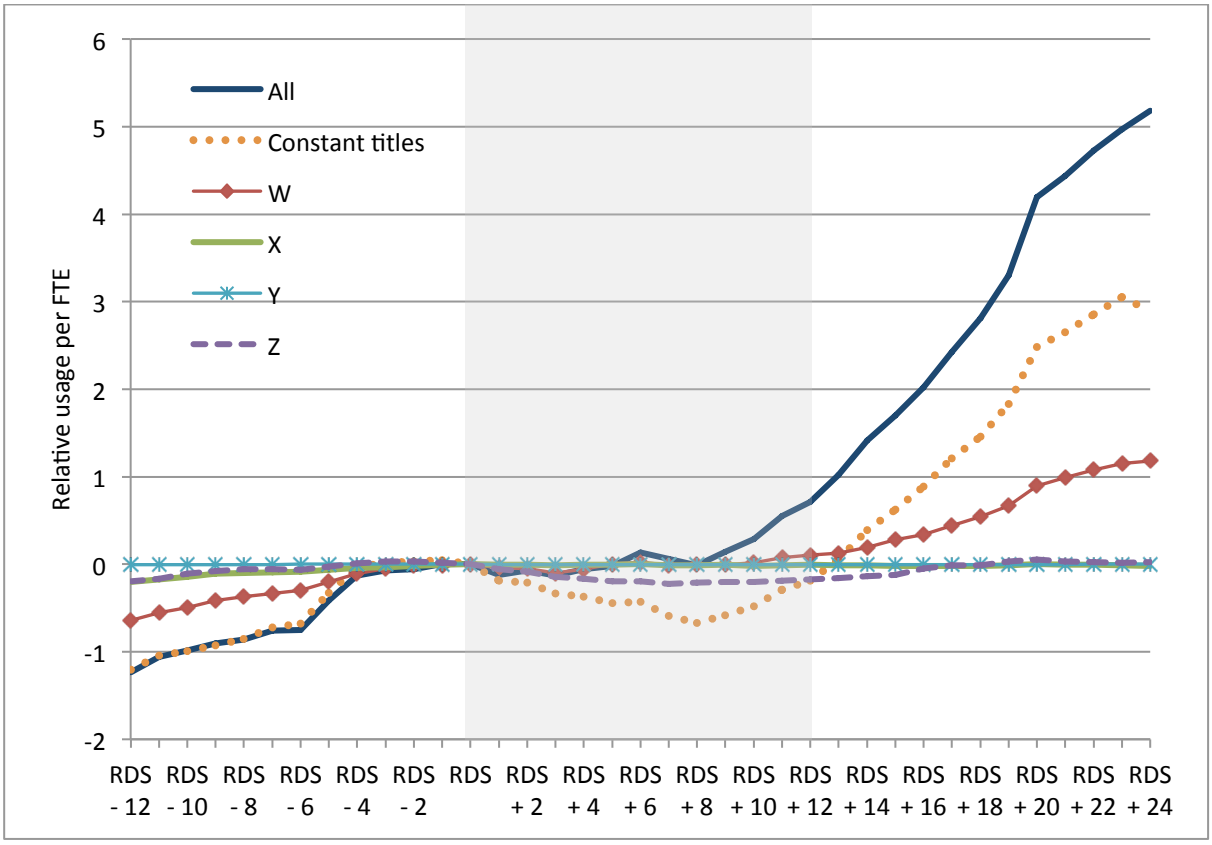
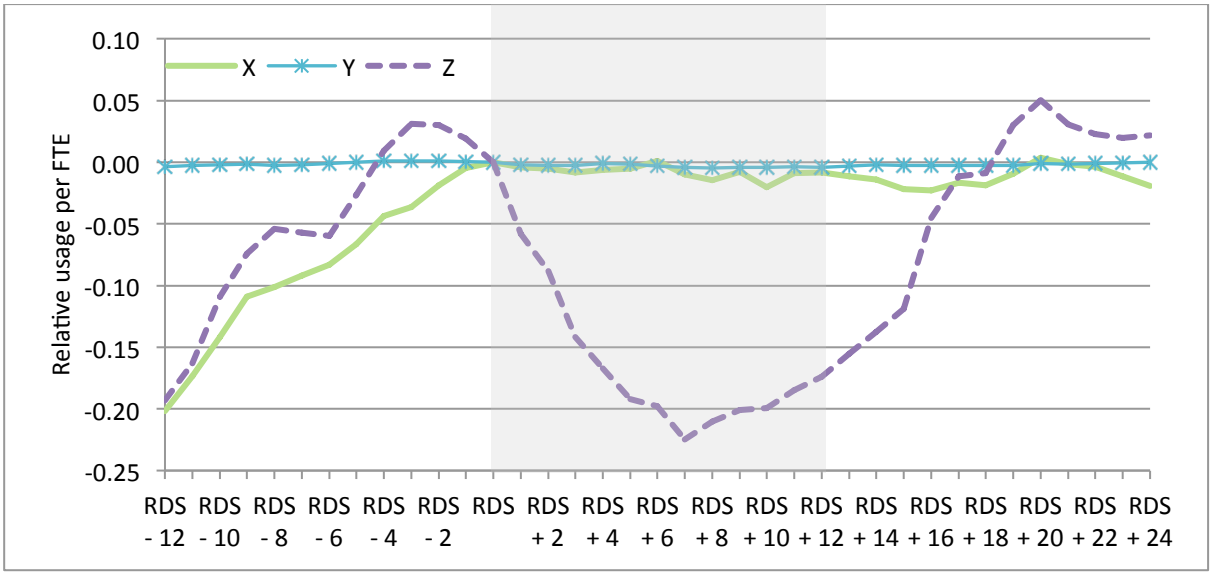


Figure 15 shows that Publisher X was recording increasing usage in the year before implementation of the RDS; library E noted that they had upgraded their package with publisher X '*well before RDS*' giving access to an increased number of titles. This may account, at least in part, for this increase. Publisher Z also reported increases in the year before implementation, but suffered a marked fall in usage in the first months following implementation; this has since been reversed and usage has returned to levels similar to those immediately before the RDS. There is very little change in usage for publisher Y.

Figure 15 Relative usage per FTE – journals – publishers X, Y and Z



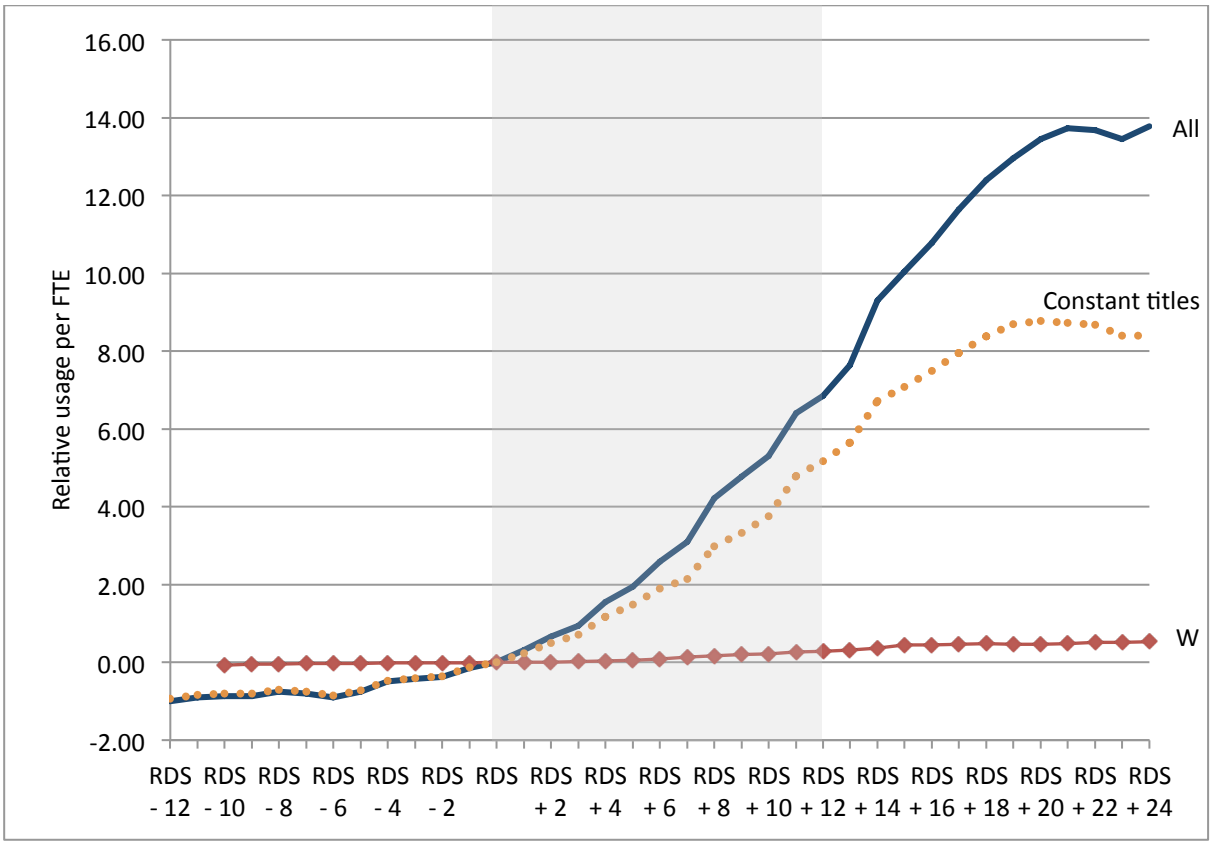
E-books

E-book data were more limited, and are more subject to variation from increasing subscription rates. The raw data from Library E show quite clearly that e-book usage was higher post-implementation of the RDS *(Figure 13).* Library E noted that they were pleased with the way the RDS surfaces their e-books near the top of the relevancy ranking.

Figure 16 shows the relative usage per FTE for the two years before and two years after RDS implementation for all data reported by library E, for a set of 11 subscriptions which recorded continual usage throughout the period, and for data provided by publisher W. In the first year after implementation, e-book usage, based on a constant set of resources, increased by some five section requests per FTE student per month, and by the end of the second year, this had risen by a further three section requests per student per month. A further five section requests per FTE student per month were generated by newly subscribed resources. Note that one collection accounts for over 70% of the usage of the constant title set throughout. Without this collection, the rate of increase has been more modest – just two section requests per FTE student per month by the end of the second year.

The interviewee from library E thought one reason why the RDS had made such a dramatic impact on e-book usage may be that before RDS, students looking for information on a specific topic would be advised to search a database, which would direct them to journal articles. With RDS, users seeking information on a topic use the RDS, finding a mixture of e-books and e-journals and can choose which to read. For undergraduates in particular, the information in e-books may be preferred as giving a more general grounding in the subject.

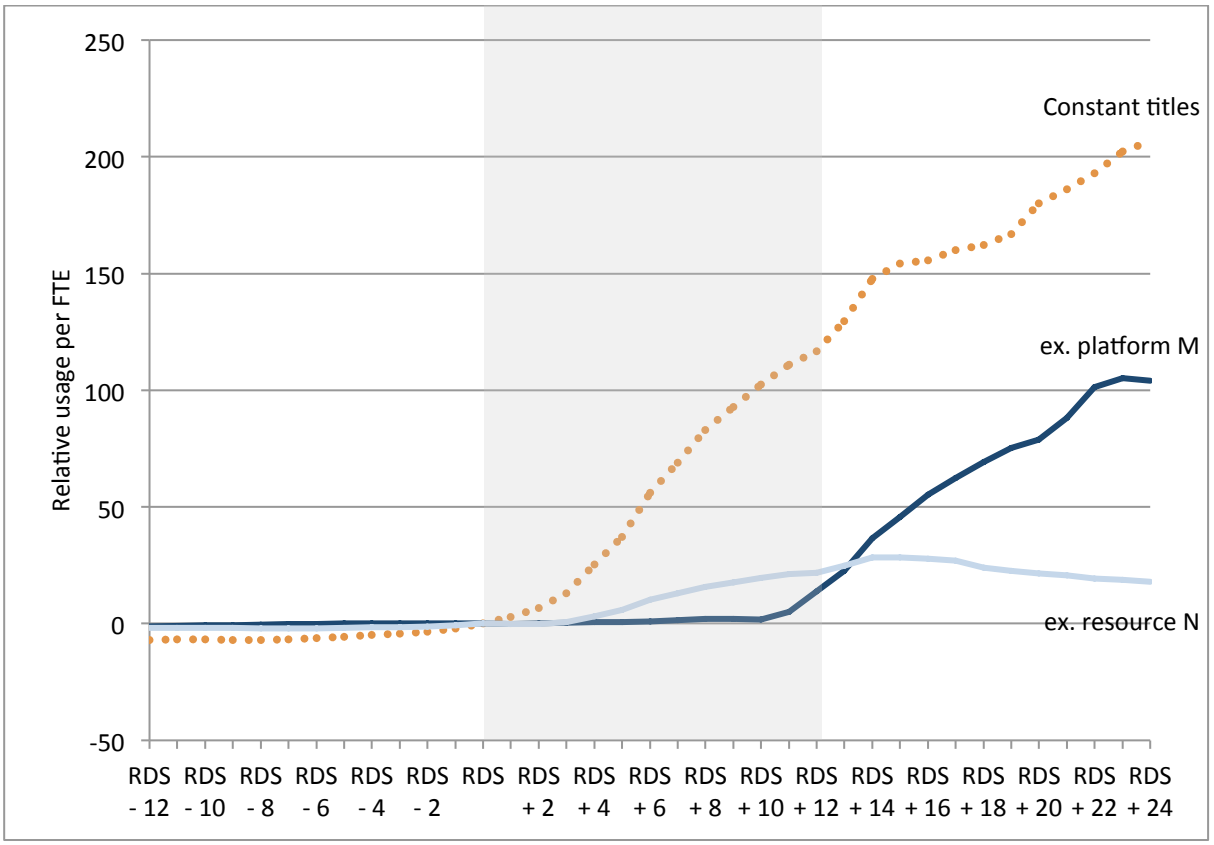
Figure 16 Relative usage per FTE – e-books



Databases

Recorded database usage at library E increased dramatically when the RDS was introduced, and the rate of increase generally shows no sign of slowing *(Figure 13)*. Database usage data should be treated with some caution, as a single user search can be implemented across multiple databases according to the interface used and so be counted multiple times, thus inflating overall usage and exaggerating the effects of any changes in 'real' usage. There are indications in the data supplied by library E that this may be the case for those databases on one platform with links to their RDS supplier; another (full text) database accounts for most of the remaining usage, which recorded heavy usage in the second year after implementation, and which has subsequently fallen back in the third year (not shown here). These patterns are illustrated in Figure 17, which shows the relative usage per FTE student based on the set of 35 databases with recorded usage across the four year period, the set of 28 databases excluding those provided via platform M, and the 27 databases which also excludes resource N. One explanation which has been suggested for the increased use of resource N is that it was heavily promoted to students in class during one academic year, and the course or tutor has since changed.

Figure 17 Relative usage per FTE – selected databases



By the end of the second year following implementation of the RDS, database searches had increased by more than 200 per FTE student per month, based on the set of 35 constant resources. Platform M (seven databases) accounted for half of this increase. Also excluding resource N, the increase in usage two years after implementation of the RDS is almost 18 searches per FTE student per month.

One publisher supplied data on searches of its databases at library E; however the figures provided showed an unusual spike over a three month period which distorted the trends, and these data have not been included in this case study.

Conclusions

A number of changes to patterns of e-resource usage at library E coincide with the implementation of their RDS, although it is beyond the scope of this analysis to determine the extent to which the RDS alone is responsible for these.

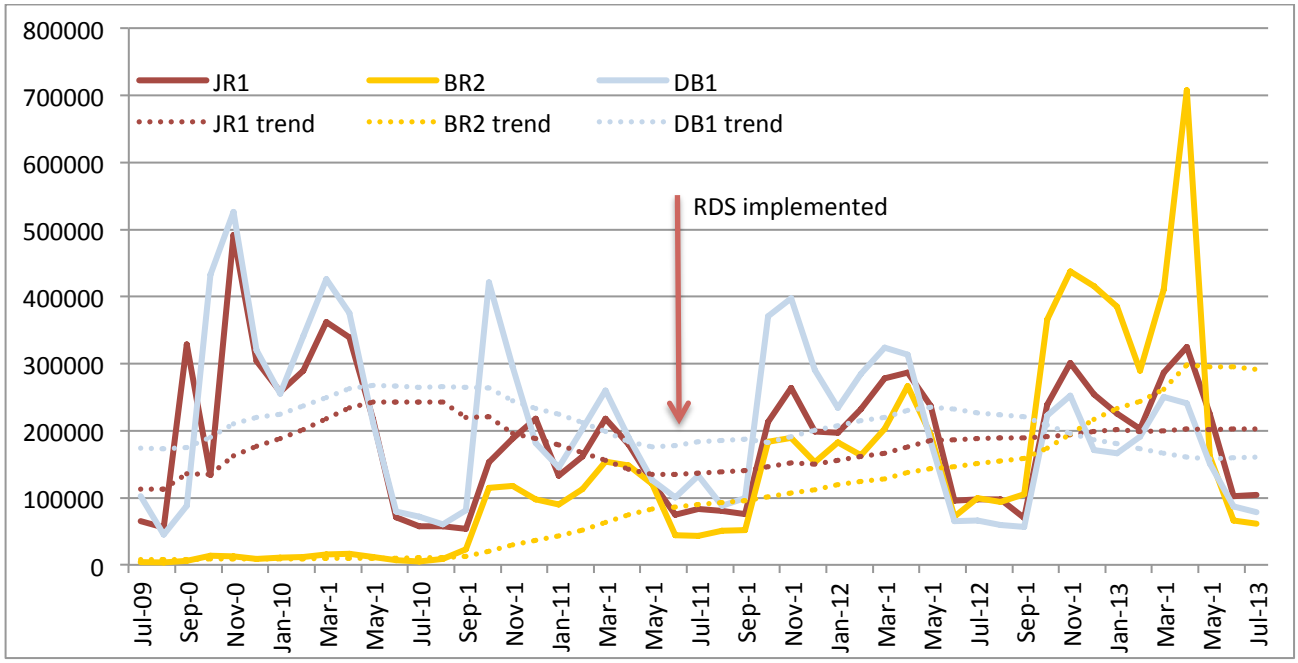
- The least impact appears to have been on journal downloads, although different resources have been affected in different ways, and the longer-term impact may be more significant.
- For e-books, introduction of the RDS coincided with significant increases in usage, but again this varies by resource, and much of the reported increase is in a single collection.
- For databases, the picture is complicated, with some suggestion of multiple counting and atypical figures for individual resources, although it seems likely that there has been an increase in usage following implementation.

2.3.2 Library F

University F implemented their RDS in July 2011. The main reason for their choice was to provide an improved and intuitive discovery experience for students, and they feel that this has been achieved.

Figure 18 summarises the total usage data received from Library F for two years before and after implementation. Figures are based on journal article downloads (COUNTER JR1 or equivalent); eBook section requests (COUNTER BR2 or equivalent; and database searches (COUNTER DB1 or equivalent), and includes all resources. As with library E, there is considerable variation from month to month across the year, reflecting increased student usage during term time, and the broad trends are also shown.

Figure 18 Overall time series



From these data it appears that the implementation of the RDS has impacted on usage of electronic resources, particularly e-books. In the survey, Library F felt that content usage "increased a lot" immediately after implementation, with "no change" in the long term, although the usage data do not immediately corroborate this impression. Other factors also impact on usage, however, most notably the availability of resources.

Journals

Figure 19 shows the relative usage per FTE student compared to the month of implementation of the RDS for all reported usage, for a subset of 17 resources which had recorded usage across the full four year period ("constant titles"), and for data as supplied by the four publishers participating in the study.

In the year before implementation of the RDS, journal usage generally appeared to be falling dramatically at Library F. However, examination of the detailed data suggests that usage reported on one platform (platform K) was exceptionally high in the previous year. Excluding this from the analysis shows that usage of the remaining resources increased dramatically in the first year following RDS implementation, since when it has fallen back slightly. Usage of Publisher W's titles shows the same pattern. Publishers X, Y and Z record lower usage levels overall, and Figure 20 shows the detail for these three publishers.

Figure 19 Relative usage per FTE - journals

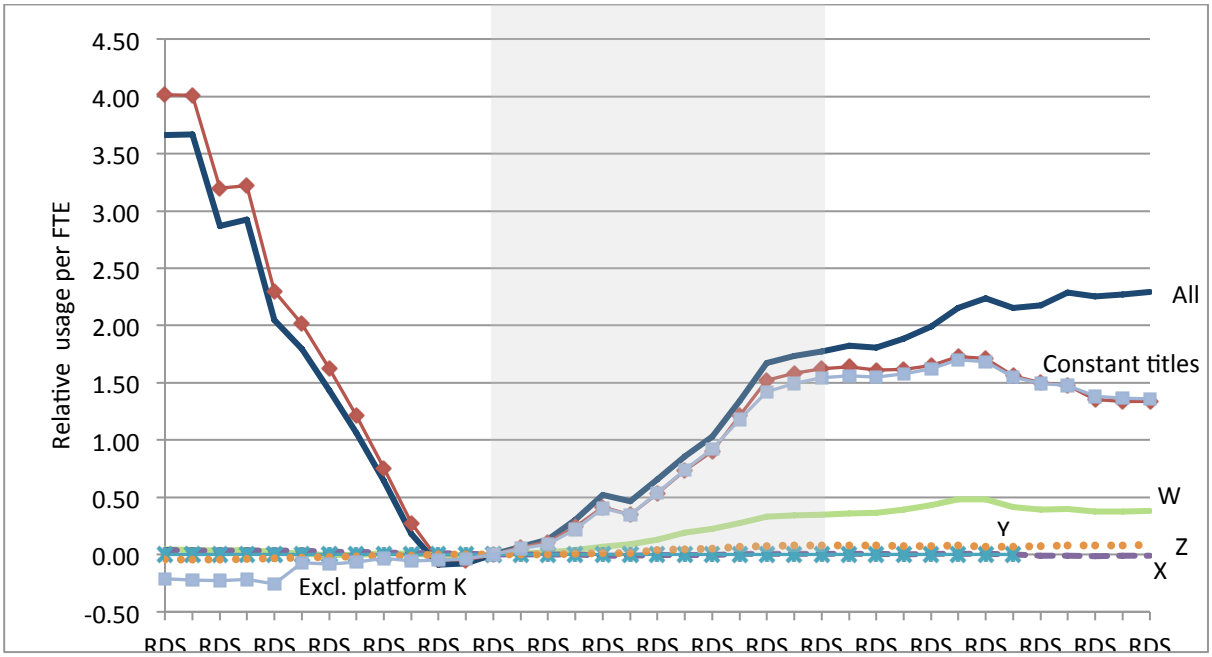


Figure 20 Relative usage per FTE – journals – publishers X, Y and Z

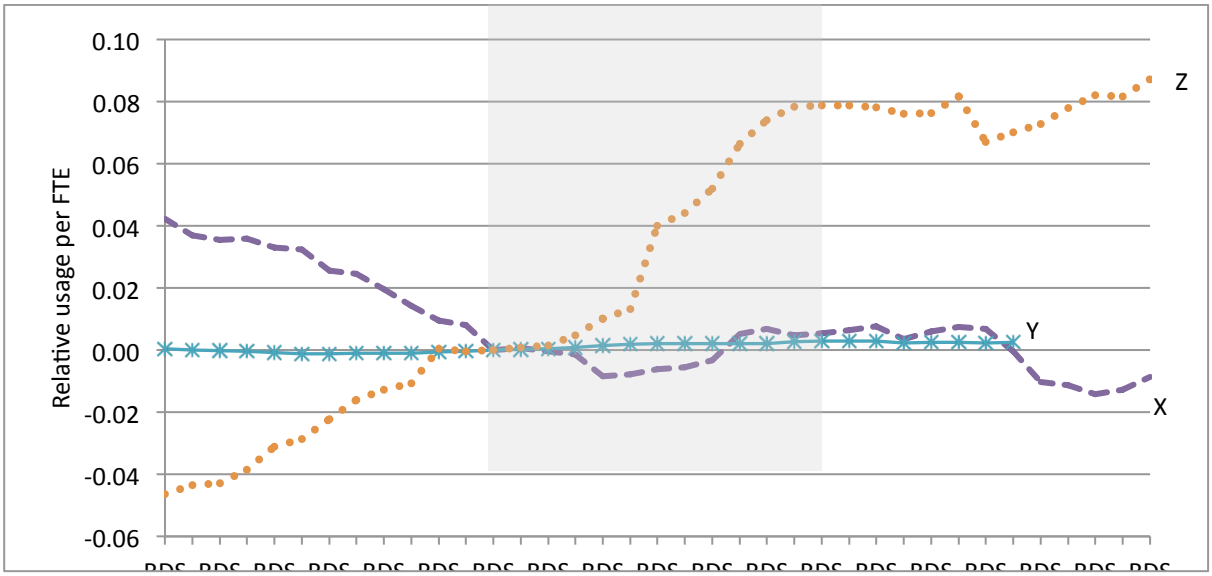


Figure 20 shows that Publisher X was recording falling usage in the year before implementation of the RDS; the decline slowed after implementation but has since resumed. Publisher Z reported increases in the year before implementation, and these increases have continued. There is very little change in usage for publisher Y.

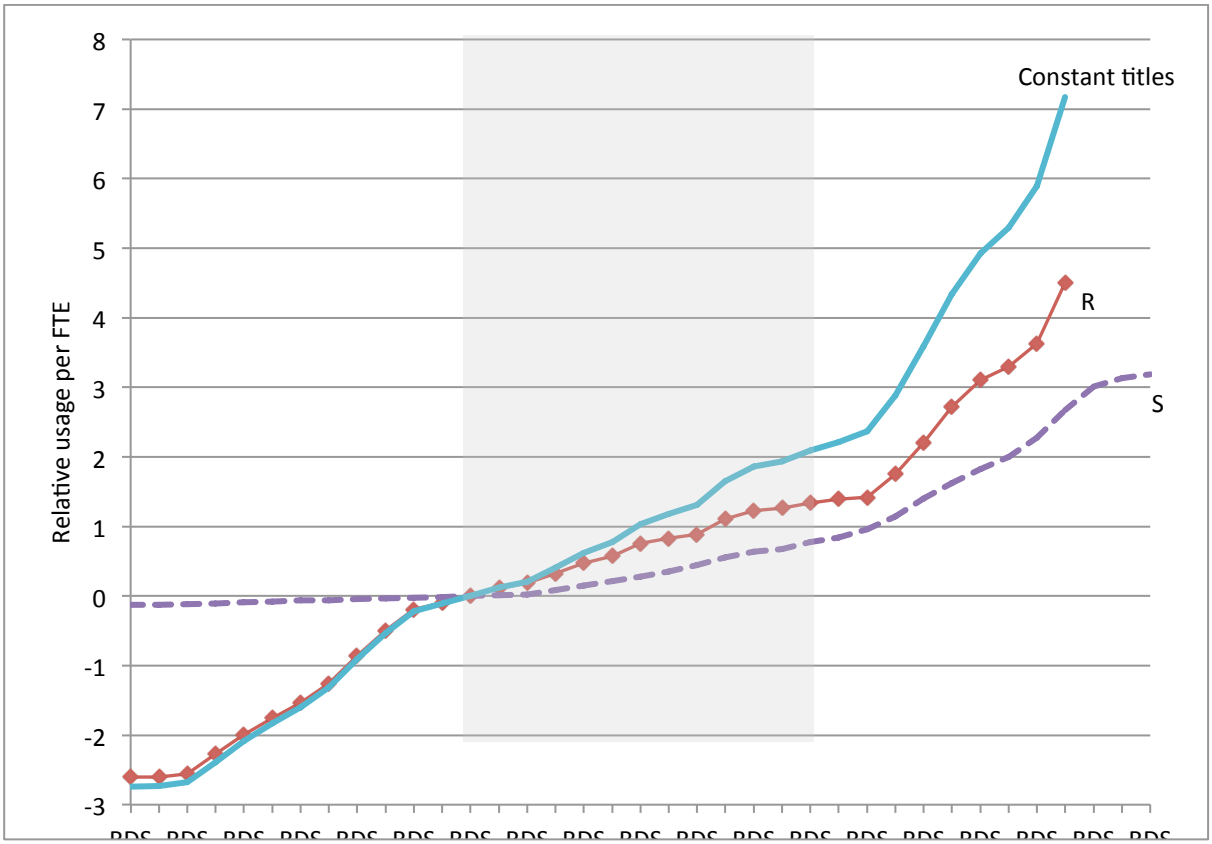
Overall, two years after the implementation of its RDS, journal usage at library E had increased by an average of 1.4 downloads per FTE student per month on a constant set of resources, with a further 0.7 downloads per FTE per month coming from newly subscribed content.

E-books

E-book data were more limited, and are more subject to variation from increasing subscription rates. Library F noted that they have had Patron-Driven Acquisition (PDA) schemes running over long periods in the last two years. The raw data from Library F show quite clearly that e-book usage was higher post-implementation of the RDS *(Figure 18)*. Library F noted their e-book content was more accessible via the RDS because they imported their catalogue records for e-books into the RDS index. A second factor was switching on 5-minute previews for one platform, making their e-books more discoverable.

Figure 21 shows the relative usage per FTE for the two years before and two years after RDS implementation, for a set of 4 subscriptions which recorded continual usage throughout the period, and for the two largest packages included in that set. For library F, the set of all data reported showed an identical pattern to the set of constant titles. In the first year after implementation, e-book usage, based on a constant set of resources, increased by some two section requests per FTE student per month, and towards the end of the second year, this had risen by a further five section requests per student per month. Newly subscribed collections add little to this total. Note that collections R and S together account for almost all of the usage of the constant title set throughout.

Figure 21 Relative usage per FTE - e-books



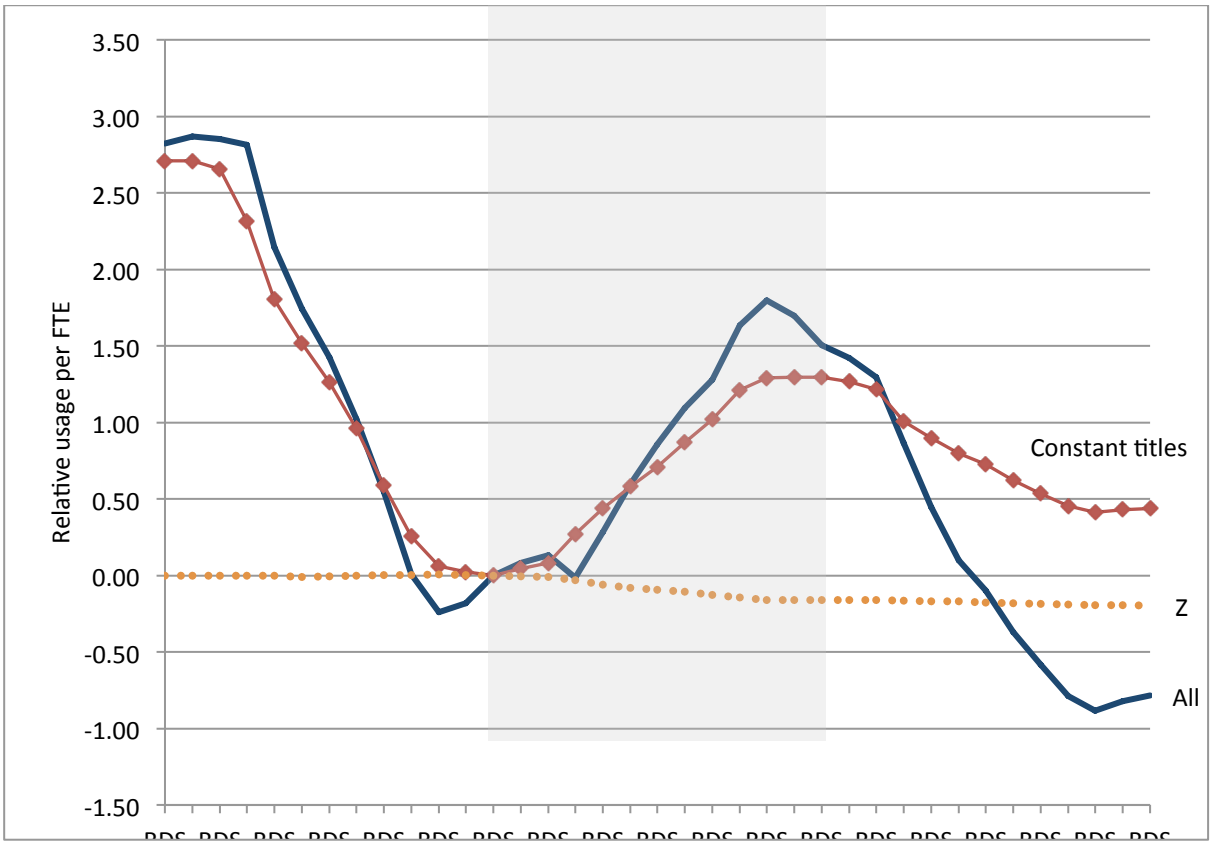
The interviewee from library F thought one reason why the RDS had made such a dramatic impact on e-book usage may be that it is set up to search full-text collections first, so those results are returned first, giving users greater opportunity to find what they need in the e-book collection before trying other resources, so driving usage up.

Databases

Recorded database usage at library F initially increased when the RDS was introduced, but has since fallen back *(Figure 18)*. Database usage data should be treated with some caution, as a single user search can be implemented across multiple databases according to the interface used and so be counted multiple times, thus inflating overall usage and exaggerating the effects of any changes in 'real' usage. Library F is aware of this, and made adjustments to the figures provided to the research team to take account of one platform which groups its content into subjects – every time a user searches in that subject, all relevant databases are searched, with each one registering the search, which library F felt was unrepresentative of actual usage. There is some evidence that this may be still the case across three databases with relatively low usage, having little if any impact on the overall trends.

Figure 22 shows the trends in the number of searches per month per FTE student, relative to the month of RDS implementation for all databases, those 28 databases recording usage in each month of the four year period covering two years before and after RDS implementation, and data provided by Publisher Z. Detailed data provided by Library F shows that several of their resources, including some of the more heavily used, recorded relatively low usage in the year immediately prior to RDS implementation, which is shown as a decline in the trends in Figure 22.

Figure 22 Relative usage per FTE – databases



Although the pattern for individual resources varies, the general trend in database usage was upwards immediately after implementation of the RDS, but this has dropped away in the second year following implementation. Based on the constant set of titles, usage remains higher than when the RDS was implemented. Newly subscribed titles do not appear to be attracting high usage however. Figure 22 suggests that overall, databases are being searched less two years

after implementation of the RDS, but that those resources which were available over the full four year period are being searched more. Changes are relatively small however – less than one search per FTE student per month in both cases. Use of publisher Z's databases has fallen since implementation of the RDS.

Conclusions

A number of changes to patterns of e-resource usage at library F coincide with the implementation of their RDS, although it is beyond the scope of this analysis to determine the extent to which the RDS alone is responsible for these.

The least impact appears to have been on database searches, although different resources have been affected in different ways.

For e-books, introduction of the RDS coincided with significant increases in usage, but again this varies by resource. The increase is continuing, but the extent to which this is affected by external factors such as users' familiarity with e-books, and academic practice in recommending resources, is beyond the scope of this analysis.

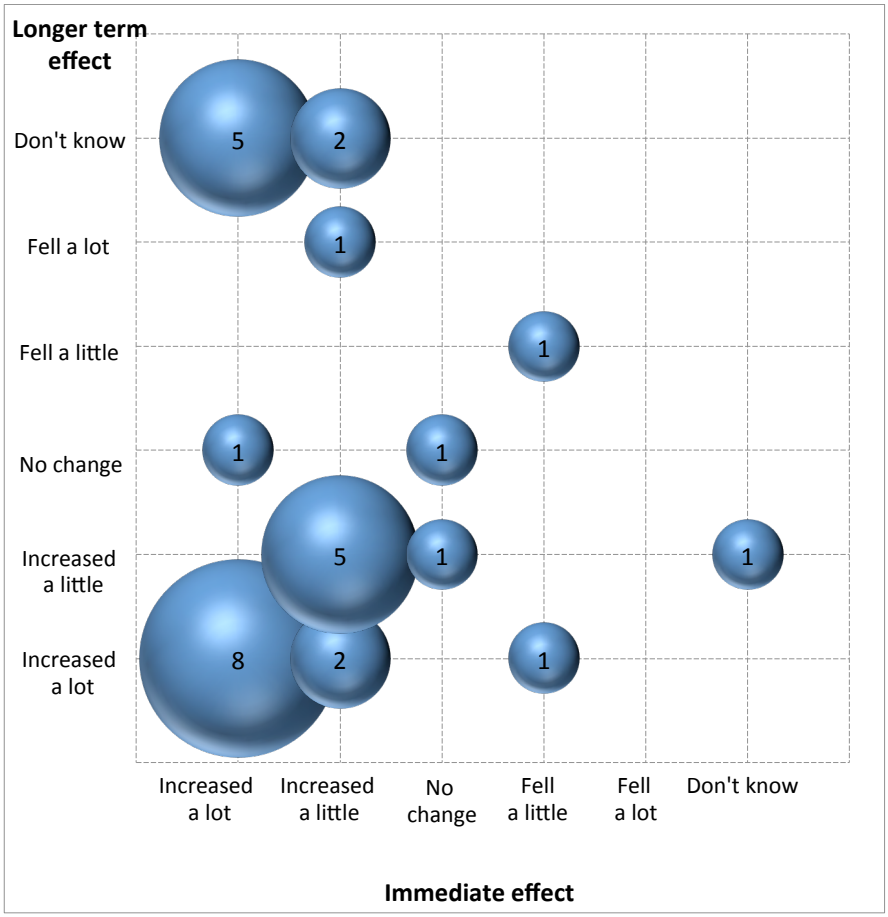
For journals, usage increased in the first year after implementation of the RDS, and has since steadied.

2.4 Perceptions of the impact of RDS on content usage

Librarians were asked in the survey whether the introduction of the RDS had affected resource usage immediately after implementation, and in the longer term. The majority of survey respondents felt that usage had increased at least a little, both immediately after implementation and in the longer term. Figure 23 illustrates the pattern of perceived change reported by a total of 29 respondents who had already implemented their RDS, and who expressed a view on one or both questions. Eighteen respondents replied *'don't know'* to both questions, suggesting that they were not specifically looking at content usage statistics, nor did they have a marked interest in content usage analysis at the time. From this, we may assume that for one-third of the libraries surveyed usage analysis is not yet a priority as they get to grips with other aspects of RDS implementation and maintenance.

> "We have the reports that come with Primo, but we haven't had time to do much with them yet."
>
> "It can be difficult and time consuming to do the comparisons."
>
> "We would like to do more in this area."
>
> "We don't yet do this – but the intention is that we would compare RDS usage with usage of individual resources."
>
> (Survey respondents)

Figure 23 Perception of changes in resource usage



The case study findings brought a richer picture of libraries' perceptions of the impact of RDS on content usage. Overall, five out of the six case study libraries reported an increase (after implementation of their RDS) in usage of e-books or e-journals or both, in varying degrees; the sixth case study library had not done any proper evaluation yet so they were not in a position to report any changes, although they did expect an increase in usage. Libraries had made it clear that their primary motivation for acquiring an RDS was the single search user experience, followed by the possibility of making their electronic content more discoverable and accessible. One library recalled that this was actually the selling point of one of the RDS vendors. Libraries thought RDS definitely had helped in making their electronic resources more discoverable and accessible. They were however cautious in attributing any observed increase in resource usage directly and solely to the use of RDS. They felt this was not necessarily the full picture and other factors put forward to explain this trend included significant increase in electronic content expenditure in recent years, users' growing preference for electronic content (users looking more for e-content than before), electronic content being more accessible owing to the RDS presence in Virtual Learning Environments or via mobile apps, development of distance learning courses, franchise courses and courses at partner institutions. Libraries thought that the trend for electronic information had been rising in recent years and with more electronic content being bought, users just consumed it. Some libraries had the feeling that usage of some of their databases was declining slightly, although they did insist on the fact that it was too early to jump to conclusions about renewals. Libraries overall thought they would need to gather a few more years of usage data before questioning any database subscriptions. They did however admit that the cost per download was important in their decision of whether or not to keep a resource. However, one library had already cancelled an A&I database for which usage had gone down, despite the Media department claiming this A&I was a key resource in the subject, on the basis that the metadata was available elsewhere via the RDS.

> "I don't have the evidence at hand but it is my impression that the resources where the navigation or pathway through to the full text is more straight forward from the RDS are achieving the biggest usage."
> (Survey respondent)

> "Some of our indications were that it was increasing usage and we believe it does make them more accessible and more visible but it's to what extent… I can't answer, I don't know, I've not run the data. […] That would be our expectations we would see an increase but certainly I know other institutions in the US were reporting 200% rises in usage but I don't think we saw that here, and it's not our expectation that that would show up in the stats."
> (Case study library)

> "If JR1 is going up and DB1 is going down, it doesn't matter too much because it shows that people are still doing full-text downloads"
> (Case study library)

3 Libraries' perceptions and experiences of discovery technologies

3.1 A unified search solution

In the last decade libraries have put a lot of thought and effort into trying to take down the silo walls erected around their collections (subject, format, type of material etc.). Improving discoverability of print and electronic subscribed content became the focus of their attention with the aim of providing their users with a meaningful library experience and better visibility of their collections, as the search box could now be embedded in homepages, Virtual Learning Environments or the library's Facebook, for example. The case study libraries mentioned library surveys, NSS surveys or anecdotal evidence whereby students had voiced concerns about the difficulty of finding materials and the painstaking and labour-intensive aspect of manually searching different databases all at once. This issue of collections being searched separately had been recognised by the HE library sector for a long time, but with the recent increase in student fees, libraries now feel even more under pressure than ever to meet students' expectations and deliver a single search user experience. With RDS, libraries are now in a position to provide a Google-like one-stop shop experience which searches across almost all library resources and beyond (e.g. open access resources). Not only is there a single place for users to search for information, but this takes them straight to the full text item wherever possible. There is an indication that this is what users want and have been wanting for a long time: a fast return of unified search results, preferably with direct full text access. There were perceptions that RDS also impact on the overall visibility and profile of the library, as noted by a case study library, "*it makes the library much more accessible*".

> "I think we had understandably high expectations, that it would be the answer to all our needs." (Case study library)
>
> "We were keen to move to a next generation search solution as we saw it a key priority for our users." (Survey respondent)
>
> "Users want full text and they don't care where it comes from." (Case study library)

Case study libraries were coming to single, unified search from different backgrounds. Some had moved from federated search to unified search while others, who had not had the resources to move to federated search when this system was the state-of-the-art tool for database searching, were moving straight to unified search. Libraries fortunate enough to have had the resources to invest in a federated search element had made it possible for their users to search across several subject-based databases; but the case study findings suggest that while this was a step forward in terms of resource discovery, the process itself proved unsatisfactory owing mainly to the time it took to search simultaneously individual databases and the quality of the results - the results retrieved were not always those expected by librarians and many results were actually pointing to resources that were not available from the library. As a result, it was thought that meta-searching was not providing a satisfactory user experience; the results were rather confusing for students and some products were known for breaking down on a regular basis – which meant that it required some significant library input to keep them up and running.

> "Because we hadn't had the money to move to any federated search we were in a position whereby we were moving from having nothing to having what we thought would be a unified search; so, in our minds we were kind of leap frogging intermediate technology because we never had the money at the time to consider federated search and even when we did start considering it, it had really been superseded." (Case study library)

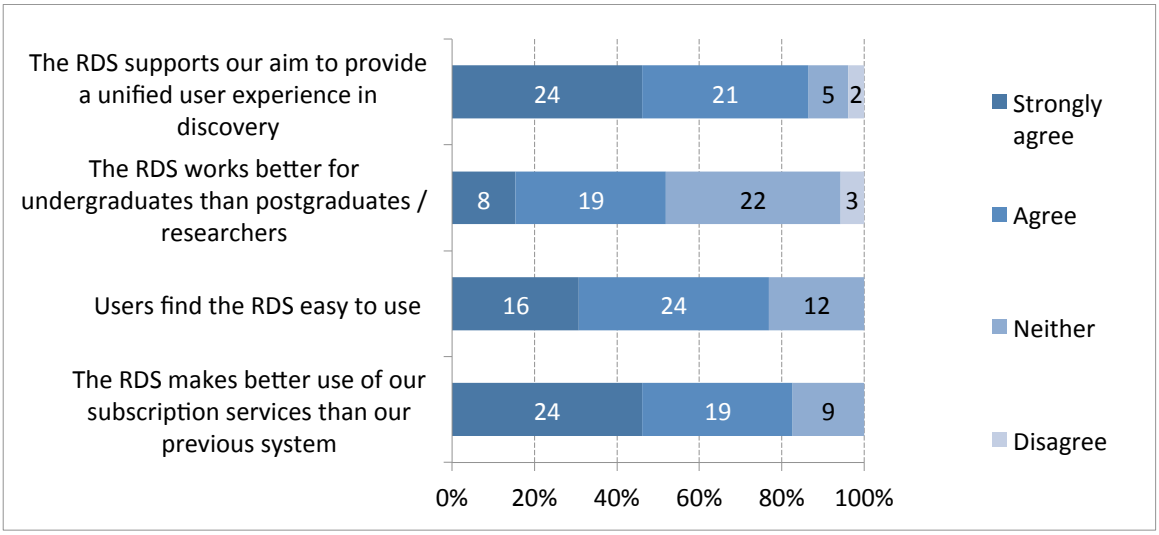
3.2 High levels of acceptance of RDS

The promise of RDS ran high within the academic library sector. This ultimate next generation search tool seemed to embody all the capabilities and functionalities libraries and users had always wanted: a single place to search across resources, with a familiar and intuitive user interface. A number of the libraries collaborating in this study actually decided to move to RDS at a very early stage, i.e. as a Beta partner institution while products were still in development. Since the introduction of this new discovery layer, libraries have been holding high expectations with respect to RDS. The question now is whether RDS have lived up to expectations.

High levels of satisfaction with RDS were reported across the six case study libraries, regardless of the RDS products chosen and technical problems that may have come about during the implementation phase. From a user perspective, ease-of-use and speed were definitely the two main perceived advantages of RDS. From a library perspective, satisfaction with RDS comes from various elements, as detailed in Figure 24. Survey respondents were asked to indicate their level of agreement with four statements about the RDS. The majority of respondents agreed that the RDS made better use of subscription services than their previous system, that it supported the aim of providing a unified user experience in discovery (although 2 out of 52 disagreed with this), and that users found it easy to use. Just over half agreed that the RDS worked better for undergraduates than for postgraduates or researchers, with three out of 52 disagreeing. The case study findings indicated that the desire to simplify access to resources for students by offering a single access point allowing fast searching across resources (print and electronic) was the main motivation for libraries to invest in an RDS. There was a particular interest from libraries for access across a wide range of electronic resources via the RDS. Indeed, case study libraries clearly indicated that they were fully aware of the limitations of other discovery approaches available in the sector, such as federated search tools, and RDS were perceived as offering greater possibilities in terms of information searching. The ability to link through to the full text via the RDS was very important to the libraries and was considered as improving the overall user experience. There were also reports of e-book content being surfaced very well by RDS, thus opening up this collection to users. Other collections such as institutional repository content were also thought to have greatly benefited from being surfaced by RDS, i.e. being used by users who would have probably not used it before, although this was to a lesser extent than e-books. Such a high level of satisfaction with RDS products was also echoed in the discussions that took place during the *Resource Discovery Services: Beyond the Blurb* conference held at the University of Bath on 5th September 2013.

> "What we wanted was a one-stop shop for accessing the library and it was our feeling and understanding that library information was difficult for our patrons to access; they actually had to learn a lot about libraries and what we bought before they could access anything."
> (Case study library)

Figure 24 Perceptions of RDS



There was a consensus amongst case study libraries that this single search experience was a lot more intuitive and easier to use than previous discovery systems. It was also thought that students would immediately see how to use it and would adopt it very quickly owing to its all-too-familiar Google-like search box. The adjoining facets enable them to refine their search by date, material type, author etc., without requiring any proper information searching skills training. The use of the unified search was generally promoted to all users (undergraduates, post-graduates and academic staff), although there was an understanding amongst librarians that the single search discovery system may particularly benefit undergraduate students, who did not necessarily require specialist information. RDS were also perceived by some libraries as a tool helping students with skills for later life when searching for quality information (development of critical appraisal skills).

> "We were looking for something that delivered the results quicker and also gave the option to refine in a variety of ways, so the students were in control. But I suppose what we were really looking for was something that was like Google that the students would take to very quickly."
> (Case study library)

3.3 Better use of subscription services

Some libraries made it clear in the interviews that the single unified search was often considered as a starting point in the information search journey, particularly a starting point for the novice user, and thus was primarily targeted at undergraduate students; one librarian commented *"you don't have to be an expert to get something out of it."* Users who required a more fine-grained list of resources, for instance users at post-graduate level or academic staff, were advised to search individual databases for obtaining more specialist and relevant sources of information. Some case study libraries thought they could not promote it to their researchers and academic staff as an effective tool. They thought the searching mechanism was too simplistic and the ranking of results not always satisfactory.

> "We reset our intentions with it quite early on that it's very good for undergraduates and by the end of [their] degree, we would expect them to be accessing resources in a different way than through Summon. They would be starting to get to know the individual databases relevant to their subject and work with them directly."
> (Case study library)

The survey findings also indicated that RDS had a repercussion that extended beyond the enhanced user experience as over 80% of respondents felt that RDS were actually enabling libraries to make better use of their subscription services than with previous systems *(Figure 24).* The case study libraries thought that RDS had made it a lot easier for users to find journal articles. With a single search journals were seen as being now more discoverable and thus more used by users. In the same way, there was the perception that e-books were surfaced very well by RDS.

3.3.1 Motivations for choosing an RDS

With regard to the motivations for choosing one RDS product over the others available, the case study and survey findings indicated that the reasons were extremely varied and often very dependent on local circumstances. Some libraries undertook extensive market research and went through rigorous tendering processes to select their RDS product. For others the choice depended more on local and personal circumstances.

Motivations put forward - in no particular order - included:

- Offer of a good deal by the RDS vendor (library often invited to become a beta partner)
- The library already subscribes to a large number of electronic titles and databases – libraries feared that journal titles or platforms would not always be retrieved or linked to easily by products from competitor vendors.
- Integration of products – i.e. the library is already a customer of other products from the same vendor (e.g. link resolver, MARC journal record service)
- Good customer service track record
- User-friendly search interface/Google-like search box – easy-to-use, fast response,
- Student experience
- Good administrative interface – e.g. not much development work required to make it easy for librarians to work with, without being too technical
- Ability to turn off the full text indexing
- Good fit for content/coverage
- Clarity of the design and construction of the RDS, i.e. what it does and how.
- Easy to implement and maintain

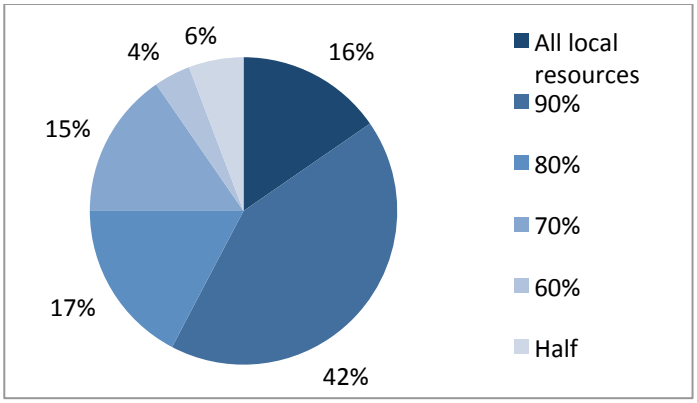
> "We looked at all the different systems on the market, just to see what they did, and we invited demos from all the providers. They all came and did demos and we had sheets that we filled in with what was a nice thing to have, what was useful, what we liked, how the look and feel of it was. […] We then […] did the proper resources discovery project where we really narrowed down exactly what we wanted. So, it was costings as well as what they could provide and then we did more supplier demos and we had focus groups as well, so we were very open." (Case study library)

3.4 Resources included in the RDS

3.4.1 Content included and indexed

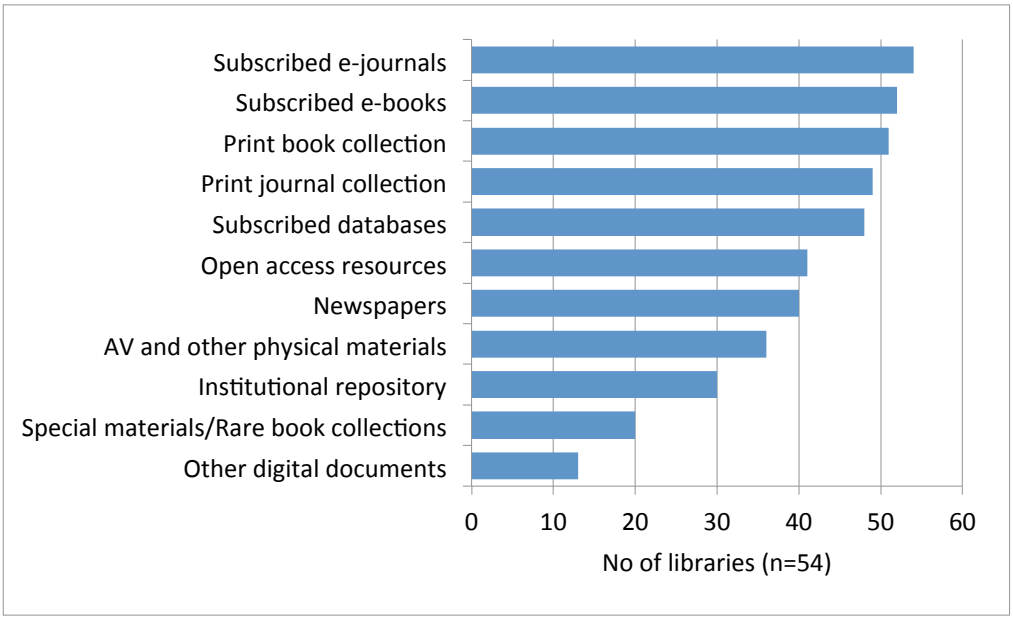
Estimates of resource coverage in the survey responses were generally high, with just over 90% survey respondents having at least 75% of their local resources in their RDS *(Figure 25).*

Figure 25 Proportion of local collections included in the RDS



All survey respondents reported including subscribed e-journals in their RDS, and over 90% of respondents also included subscribed e-books and their print collection *(Figure 26).* In the case studies, the issue of whether libraries should include electronic content for which the library has no licence was raised, with one library having experienced both sides of the coin. If non-licensed content is retrieved and displayed via the RDS, users get to discover more material useful for their learning or research but as the proportion of non-licensed content indexed in the RDS grows the chance of retrieving material with full text diminishes, which creates frustration. On the other hand, if only licensed content is retrieved and displayed via the RDS, expert users who have a very precise idea of the material they are looking for also get frustrated, when they would be prepared to order it via the library's document delivery services if the library had no access.

Figure 26 Type of content included in their RDS



In the survey, some institutions reported having deliberately not included some resources in their RDS. The most common type of material not fed into RDS included:

- Open access material, including institutional repository
- Free bibliographic collections or non-full text bibliographic databases
- Archive material, special collections
- Newspaper collection

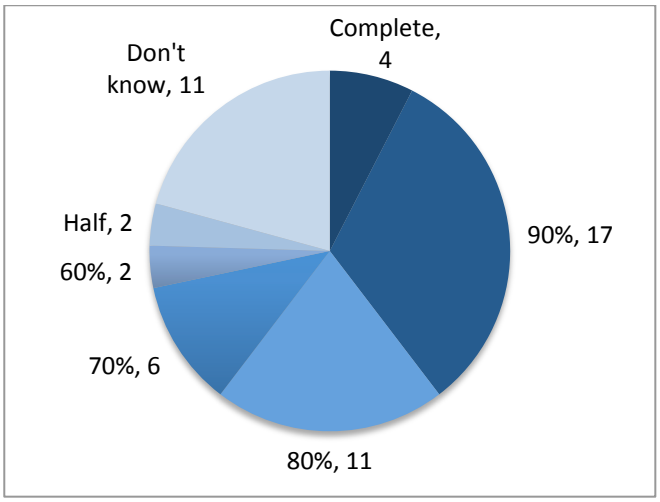
Technical problems with feeding the data from the institutional repository to the RDS were sometimes put forward as a reason for not including this type of open access material, although it seemed that no clear conclusions could be drawn on this as experiences with linking to institutional repositories varied greatly from one institution to another. The inclusion of open access material from the institutional repository was sometimes perceived as lower priority and therefore was not necessarily implemented from the outset. With regard to newspaper collections, it was often felt that the inclusion of newspaper content in the ranked results 'cluttered' the list of results of quality academic resources.

> "We withdrew newspapers accessible through the central index as most were short news items which resulted in unrealistically raised user expectations of full text articles." (Survey respondent)
>
> "The indexes are huge, they're enormous, millions of results, and we quickly had to suppress things like book reviews and newspaper articles because they were just swamping the results"
> (Case study library)

With respect to the resources indexed by the RDS, some case study libraries reported that one of the downsides of having access to such a huge index via the RDS is that an institution's locally held content, i.e. the content that was bought, catalogued and indexed, could be easily submerged, thus potentially producing a lot of noise in the results. This was particularly the case for book reviews and newspaper articles, and those were often deliberately excluded from the search, wherever possible, by case study libraries. Another example illustrating the impact of the index on the discoverability of local content was the inclusion of the HathiTrust Collection (a collection of millions of titles digitized from libraries around the world) for which an RDS search for a print book held locally could, at the time, surface numerous records from the HathiTrust Collection.

Survey respondents were asked how close they thought the match was between the resources licensed by their library and those that the RDS included in its central index. The majority of respondents thought that the match was 80% or better, although only 4 (out of 53) felt that all their licensed resources were included in the RDS *(Figure 27)*.

Figure 27 Correspondence between licensed electronic resources and resources included in the RDS's index

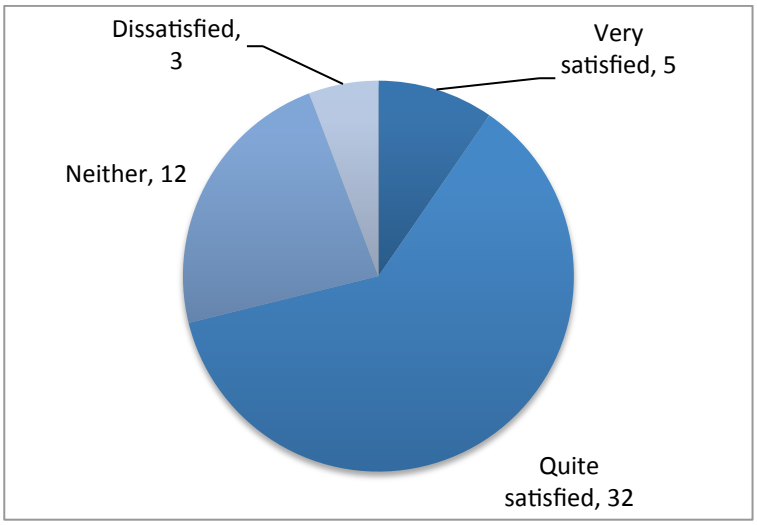


3.4.2 Satisfaction with content

Survey respondents were asked how satisfied they were with the publishers' content as offered by their RDS provider, and the majority were very satisfied or quite satisfied *(Figure 28)*. The only three survey respondents who indicated being dissatisfied gave the following reasons:

- *"Many titles 'in the pipeline' for a long time and not available"*
- *"Problems with EBSCO and Serials Solutions"*
- *"We provide our own content using EBSCO's A-Z service […]. We have done a lot of work on the reliability of the data in recent months and [are] greatly perturbed by the lack of accuracy and coverage. KB+ is far more reliable (we've done a lot of comparisons)"*

Figure 28 Satisfaction with content offered through RDS



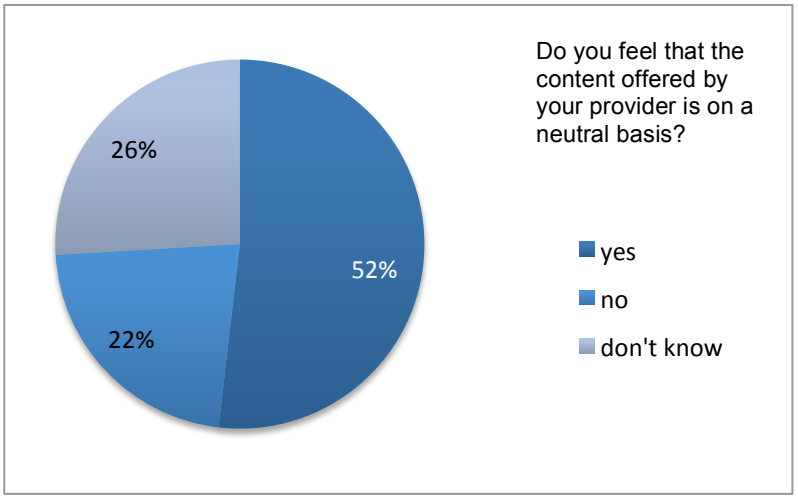
The case studies allowed the research team to explore further those reported levels of satisfaction with RDS coverage of e-resources. The case study findings indicated that libraries were generally happy with current levels of RDS coverage, despite rarely covering their subscriptions fully. In the interviews, it transpired that it was actually very difficult for libraries to know precisely the coverage of the RDS for their subscriptions. Libraries often reported being unable to identify or see for themselves how well their resources in the knowledge base matched the RDS' index; this coverage information had to be requested from the RDS supplier, and this was thought to be a problem. In most cases, case study libraries had had access to coverage lists but there were reports that the information included on those lists was often vague and possibly misleading. For instance, it was felt that RDS vendors were trying to get as many journal titles as possible on the lists but it would appear that numerous titles had actually only a few years of content available and not necessarily the most recent years. One case study library commented *"what has always been difficult is to try and understand exactly what is being indexed in Summon because we think of things in databases as a unit whereas they could take the list of journals that are indexed in a database and say we index so many percentage of that database – that was the difficulty, trying to map our databases against the Summon index to see what the coverage was. […] It was quite hard to get a full picture."* With regard to justifying the cost, one case study library reported that despite the cost involved for no extra licensed content they were still confident it was a good move overall, and especially when previously under-used content seemed to be now getting more usage via the RDS.

> "It's good enough for what we wanted Summon to do, but we have to make people aware that the databases are there for the complete coverage of their subject."
> (Case study library)

> "That of course was plucking a figure out of thin air! I have no idea what our real coverage is. I was just trying to make allowance for the fact that it doesn't include newspaper content, […] some of the market reports, and doesn't really cover Lexis and Westlaw."
> (Case study library)

Furthermore, libraries were asked whether they felt that the content offered by their RDS provider was on a neutral basis. Just over half of survey respondents felt that it was, while 22% felt that it was not *(Figure 29)*. One library commented: "*we have heard that the content offered may not be entirely neutral, in that the thoroughness of updating the indexes may be greater for e-resources which are owned by the same parent company as the RDS, compared with those from competitors, but we have not investigated this yet for our resources.*"

Figure 29 Perceptions of vendor neutrality



3.4.3 Relevancy ranking

A corollary of RDS coverage and neutrality is relevancy ranking, i.e. how the results are ranked by the RDS. This was explored further in the case studies. There was a consensus about the importance of relevancy ranking within RDS systems, although the details of how it worked exactly were not always known. There was an understanding that some weight was given to certain types of sources, as well as to where the keyword searched was found (more weight if it is found in the title than in the abstract, for instance), making it possible to display quality academic sources at the top of the ranking. Some libraries reported being able to put extra weighting from the RDS administrative interface. With users doing predominantly 'naive' searches (as opposed to constructed advanced searches) and often limiting their search for information to the first page of results, relevancy ranking was thought to be essential in providing users with the relevant sources of information. There were reports that questions about the relevancy ranking were often left unanswered – *"at the time, when we first asked everyone, nobody could really tell us how they did it"*, one librarian commented, but this was then made more transparent in the RDS user group, possibly as more people asked the same question. Overall, relevancy ranking and vendor neutrality did not appear to be a major concern for the libraries interviewed.

> "I guess we are less interested in whether EDS indexes a particular journal than whether it indexes a particular database, which in turn indexes a list of journals. So, in a way I assume that good journals are indexed in good databases, so if EDS is getting metadata from those big databases that's all we need to know."
>
> I attended a couple of webinars where they have explained in great detail how their relevancy ranking works and I'm satisfied that is all honest and above the board. They will give the richest records the top priority because it will have those elements in it."
> (Case study library)

3.4.4 Clarity of indexing

Clarity of indexing of RDS products was definitely perceived as a big challenge for libraries, with some RDS vendors performing better than others in this area but still a sector wide issue. There seemed to be a lot of uncertainty and confusion about what is and is not in the index, and why. Case study libraries did however recognise the enormity of the task for RDS vendors if they were to compile comprehensive and up-to-date coverage lists but they also felt that this was the sort of detailed information that would have helped them, particularly during the selection and implementation phases. One case study library demonstrated a more moderate view on this, noting that *"the coverage lists certainly aren't perfect but I think people who are seeking perfection are being unrealistic."* On occasions, it was mentioned that knowing that the RDS product provided access to the metadata of certain databases, such as Medline in medicine or Scopus for science and engineering, was more important in terms of subject coverage than having a detailed list of journal titles because those very journals would be indexed in Medline or Scopus.

> "When buying Summon we didn't see ourselves ending up with a number of search systems, that was not the aim but the reality is that law resources seem to be very different and work differently and we don't see a point at which that would be fully resolved in any of the discovery layers offered by the vendors currently." (Case study library)

More than half of all survey respondents (32 out of 51) had identified gaps in the content offered. The most common gap by far, mentioned by 18 of the 32, was law. Nine respondents mentioned issues with EBSCO content – none of these used EBSCO Discovery Service as their RDS. The case study libraries also reported gaps in coverage in some disciplines, particularly in the area of law and

management. For the law discipline, the indexing of the two main databases, LexisNexis and Westlaw, appeared quite poor, and generally geared towards US content rather than UK content. Currency of coverage was also reported as an issue by some libraries – there were reports of delays of a significant number of months before the material actually appeared on the RDS' central index. One of the reasons put forward about why low levels of indexing could be observed for legal databases was that it was believed that suppliers of law content had not really engaged yet with RDS, possibly because the academic market was very small for these database providers. In those circumstances, case study libraries recognised that they had no choice but find alternative routes to making the content findable, either by advising their law students to search individual legal databases for comprehensive legal resources or looking into one-stop shop commercial systems developed for private legal firms, which is the route one case study university took with their custom made search solution for law resources, for instance. Management was another subject where libraries reported gaps in the coverage, with market reports and company reports often not included in their discovery layer.

Interestingly, from the various individual stories collected in the interviews and survey responses, the implementation of an RDS did not necessarily mean the immediate abandonment of existing federated search tools, for those who had already one in place. While those tools were often perceived as unsatisfactory by libraries and their users, and usage was declining, there were suggestions that those federated search tools could still be needed in some cases to help users find relevant sources that were not currently indexed by the RDS. There were reports that federated search was still, for instance, the preferred route to search subjects such as education. In the survey, fewer than half of all respondents (21 out 53) had a federated search component in their RDS, while 30 did not. Two respondents did not know.

3.5 Challenges and issues associated with RDS

3.5.1 Omissions from the RDS

Partial coverage in some disciplines such as law or management has been discussed above. Although this was reported as one of the major issues with RDS, libraries had actually recognised it early on and had taken steps to mitigate this issue either by making it clear to this group of users that the information they require will be provided only very partially through the single search tool and that search of individual databases was still the best way to retrieve relevant information in their subject, or by providing additional search tools for those databases not indexed in the RDS. With regard to database providers in other subjects, one library reported on an example with a bibliographic information publisher in the education area which did not wish to contribute metadata to RDS because they felt threatened by RDS types of services and did not want to risk losing control over their own data. A related issue was that some publishers do not have their site designed in a way that allows deep linking. An example of this was InfoTrac, where a case study library reported having switched off the RDS because the links were not taking users to the article level.

> "[The] biggest issue is the lack of cooperation between EBSCO and Serials Solutions leading to poor links to EBSCO resources."
>
> "Until ProQuest and EBSCO can find a way around the issue there will be issues relating to getting information about EBSCO collection publications via Summon."
>
> "Generally coverage pretty good – very much want to see an end to issues like the EBSCO/Ex-Libris one over content indexing – ideally we want to a point where metadata is shared freely enough to make discovery of resources equal in terms of particular supplier interface each library chooses to use."
>
> (Survey respondents)

Moreover, the quality of the metadata received from publishers via the RDS was thought to be extremely variable, from the sparsest record to full text indexing. Having such huge granularity and such detailed metadata was not necessarily perceived as an advantage and there were reports of case study libraries actually turning off the full text indexing option with a view to making the metadata look more consistent across different content providers and limit the noise that full text indexing was creating in the results.

3.5.2 Vendor rivalries

Another major issue reported by survey respondents and case study libraries was the on-going 'rivalry' between Ex-Libris, EBSCO and Serials Solutions (part of the ProQuest family), with all three companies having vested interests in many library products at different levels of the library chain. One recurring comment both in the survey responses and in the discussions with the case study libraries was the on-going issue between EBSCO and ProQuest, both of them being both a publisher and an RDS vendor. As a result, libraries' understanding and perceptions of the situation were that each company was unwilling to cooperate and feed metadata to the rival RDS vendor. The implications of this position taken by two giants of the academic library world were that libraries having Summon (Serials Solutions) were finding it difficult to access all their licensed EBSCO resources via their RDS, and conversely, libraries having EDS (EBSCO) were not able to access their licensed ProQuest content in a satisfactory manner via their RDS. Libraries clearly indicated that this situation was not tenable and showed their frustration at being a client of both companies. They recognised that this situation was ultimately not without consequences on library users, the impact varying according to the profile of the institution, but they often found themselves in a position where their only option was to wait and see, and hope for a resolution. In a word, libraries felt powerless and hostages in this fight over library market domination and frustration is growing; one librarian commented *"it can be quite frustrating at times being a customer of both, and basically like watching two children scrap it out in a playground. You just want to bang their heads together to get them to work together but they don't appear to be talking."*

> "We quickly found that it was easier just to switch to 360 Link because of the knowledge base and keeping everything in line, so quickly we switched to 360 Link."
> (Case study library)

There were indications that RDS integration with other library systems and products from competing vendors could also be a challenge for some institutions. Some libraries described the process of integrating products of different providers as tortuous and labour-intensive. Most case study libraries reported having changed products, often the link resolver, following the implementation of their RDS. This was often the result of systems not talking to each other in the way they should ("*clunky fit with other systems"*) and requiring therefore a certain amount of staff time to update the systems to enable exchange of information between systems. One library working with EDS had changed both its link resolver and its subscription agent from Swets to EBSCO to ensure a more efficient discovery and access management of its electronic resources. Indeed, libraries which had gone for a whole suite of products from one single vendor indicated that it was definitely an advantage for them to have one joined-up system allowing exchange of information between products in a streamlined and efficient way. Having a catalogue from another product range was another example put forward in the interviews with libraries; libraries in this situation had to export their catalogue on a regular basis, or at least schedule daily updates, to keep the information in the RDS up-to-date, as automatic harvesting (in the way institutional repositories would be harvested, for instance) proved difficult, if not impossible for some libraries. It was reported that delays for updates or new content to appear in the RDS could go up to 48 hours without always being sure that all of the updates made it

> "So slowly what we've got now is one system that is looking after the majority of our holdings […] whether it would be usage, admin details, costs, contacts, years […] The product is driving pretty much of what we're doing. So the advantages behind the scene are as great as the students' single search."
> (Case study library)

through. This was thought to be not satisfactory. One case study library reported having asked to be provided with diagrams of how information was flowing between systems to help understand better what happens and when, but as one librarian commented *"this information is just not forthcoming. You ask the question to different people and you get slightly different answers."*

3.5.3 Broken links

Broken links to full text items within the RDS were understandably perceived as a major problem, when they happened. Some case study libraries had experienced recurring problems with broken links. OpenURLs were reported as a recurring problem having a significant impact on the libraries, not the least because RDS are acquired with a view to providing users with a better discovery and access experience with electronic content. OpenURLs are heavily used by academic libraries to help connect their users to the electronic content to which they subscribe. They are particularly used to link databases or other information aggregators to individual e-journals or e-books via link resolvers, which automatically query an institution's knowledge base (i.e. a representation of an institution's electronic holdings) for details on availability and accessibility for a specific electronic item, thus allowing users to access smoothly the full text in the native platform from a database citation. Some RDS were thought to be over reliant on link resolvers to get to the full text and thus possibly more prone to broken links, whereas others were thought to be more amenable to open linking in the native interface. This linking issue ties in closely with both the aforementioned product integration issue, whereby queries to the knowledge base can prove difficult if the link resolver and the RDS do not exchange information in the way they should; and the on-going issue of lack of metadata feeds between EBSCO and ProQuest. Another example of broken links reported in the case studies was in relation to the quality of the metadata held by the library. One case study library explained that they had spent a lot of time over the last two years cleansing their metadata, as after investigation issues were highlighted with their *"own wonky metadata"*, which resulted in the RDS interface showing glaring errors in the results. Libraries reported having some limited control over full text linking, the RDS systems often allowing them to elevate the publishers they would prefer their users to go to first. Some problems were reported with linking to e-books or e-book chapters where linking does not always take users to the front page of the book or to the requested chapter.

3.5.4 Implementation issues

Finally, another issue associated with RDS and reported by some case study libraries included the occasional lack of flexibility of the products in the implementation phase. For instance, one library commented that with their RDS the way e-books and print books, and e-journals and print journals, were combined was not ideal as it was found to be confusing for users. Another example was the pre-setting of the index and categories, including the facet labels, which were not necessarily the ones the libraries would have chosen. However, libraries thought that RDS suppliers were, in most cases, receptive to their development requests and display could be improved in order to have a better user-experience.

3.6 User interaction and perceptions

Survey findings indicated it is still early days for user interaction with RDS. Thirteen respondents (out of 54) encouraged user interaction with their RDS, such as tags, reviews or rating. Mobile

access via an app was not usual, with only 7 (out of 51) libraries offering an app for any device. Modified html was more widely available, however, with 32 out of 54 libraries offering modified html for tablets and smartphones. Nine libraries (out of 51) offered access to the RDS via Facebook, and nine did so via Twitter (seven offered both). Two more libraries were planning to offer access via Facebook in the future, while two libraries used social media to market the RDS, but did not offer access.

Overall, case study and survey findings indicated that user feedback was good. Forty eight respondents reported on feedback from users, and this was generally positive for 29. Nine reported mixed feedback, including noting specific problems which had subsequently been addressed, while just six reported negative comments. Four respondents had not sought feedback, or thought it was too soon in their implementation programme. Examples include:

- *Excellent feedback from Students and Staff alike -'great I can do research again' - senior member of faculty staff*
- *Generally very positive, urging us to promote it more to a wider audience.*
- *Our users like it a lot. They think it is effective and modern.*
- *Well liked as easy to use and generate references for coursework. Much preferred to the complexity of databases, which students see as too hard to use.*
- *mixed, some users like the "one-stop shop", others find it not precise enough (related to the resources in PCI & users own searching practice), others don't use it at all - preferring Google/Scholar.*
- *There was some negative feedback in the days immediately after implementation, particularly from a few senior academics who were fairly expert with the old catalogue. However, usage of the RDS is much greater than it was with the catalogue.*

The case study findings echoed such positive feedback from users. Librarians felt that there had been a good take up of the single search system by users and library staff, although it was recognised that for some users and staff it did create some disruption, initially, as they had got used to working with the previous system.

4 Views on discovery services from publishers, other content providers, RDS suppliers and stakeholders

4.1 Contribution to discovery services

4.1.1 Motivation for publishers and content providers

Improving discoverability and visibility

In the interviews with publishers, there was a strong feeling that improving discoverability was key to their publishing business as improved discoverability and visibility are seen as helping increase content usage Overall, publishers were particularly keen to supply metadata to RDS to improve the visibility of their resources. Some also provided full text indexing, although some reservations on this practice were voiced by some of the publishers and it would depend on users' access rights to full-text content.

> "We do everything we can to make sure our content is as visible and as discoverable as possible."
>
> "We don't see any challenges or issues with having content in discovery services; it's in our best interest to have our content there. As with search engines and A&I services, it's important for our content to be represented in the systems our readers are using to find content relevant to them."
>
> "Discoverability is key to everything now so we'll explore any channel to make our content discoverable that still fits within our overall models."
> (Case study publisher)

Aiding their library customers to improve search experience

Publishers indicated that they wanted a presence in the discovery tools their users used, and discovery services were now becoming an important part of this. The one-stop shop of discovery services was perceived as a big advantage for libraries, replicating the Google search experience - with natural language searching - their users were familiar with, with the difference that only quality academic resources were actually included in the search. In a way, there was the perception that RDS provide a quality service that Google cannot provide.

Providing service for their authors/editors

Furthermore, one publisher actually felt that it was their duty towards their authors and journal/book editors to provide the best possible service in terms of access and readability, and RDS not only push traffic to the publisher's site but also help facilitate the encounter between content and users.

4.1.2 Reasons for non-participation

All the publishers interviewed were contributing data to RDS and felt it was in their best interests to do so in order to increase traffic. Reasons suggested for non-participation included technical barriers or lack of awareness of market changes.

Reference was made to at least one publisher who had made a strategic decision not to feed data to RDS on the grounds that it would dilute their brand and its added value, with discoverability not giving a strong enough business case. This was recognised as a potential reason for non-participation particularly among A&I database providers who provided a more specialist search experience.

4.1.3 Proportion of data contributed to RDS

Most participating publishers contributed data to the four main RDS systems available on the market, i.e. EBSCO's EDS, Serials Solutions' Summon, Ex-Libris' Primo and OCLC's WorldCat Local. Three publishers reported 100% coverage, i.e. they fed 100% metadata of what they publish into RDS.

For content providers included in the study who were also RDS suppliers, metadata were at present being provided to a smaller number of RDS. As aggregators of other people's content, they pointed to their obligation to ensure that both customers and contributing publishers were getting a good experience. Any on-going discussions on this issue would be confidential.

4.1.4 View from RDS suppliers

RDS providers were asked if they found it easy to convince publishers to agree to feed data into their RDS. Both participating RDS suppliers found that publishers were keen to contribute, citing their existing good relationships with publishers and the way that the concept of discovery was now well understood.

The most important aspects of the negotiations with publishers were to get them to understand what the particular RDS had to offer and to work on the data delivery format, how the data were to be delivered and frequency of updating. A distinction needed to be drawn, pointed out one RDS supplier, between primary publishers who offered full text without high quality subject indexing, and secondary publishers who may have high quality indexing but no full text. For this latter group, it was recognised that there were more issues to overcome.

> "Also, providing usage data and usage statistics from discovery services is relatively new, and because they [RDS] are relatively new as well, … so obviously customers adopt it over time so we are only just getting to the point where we have a critical mass of usage data that can show trends year on year etc. I guess that sort of data will help to make those people more comfortable as well."
> (RDS supplier)

Asked why they thought some publishers might be reluctant to feed data into the RDS, one RDS supplier suggested that this may be due to lack of awareness of changes in the market, or technical barriers to participation where, for example, they had insufficient metadata. There was a view that there would always be early adopters and others who preferred to wait for more evidence. With more customers adopting RDS and a critical mass of usage statistics becoming available, there would be more evidence of usage trends to convince those who may still be reluctant.

4.2 Technical challenges to ensure discoverability

4.2.1 Publisher views

Publishers generally thought that the supply of metadata to RDS was relatively straightforward. It was generally accepted that the impact of feeding data to RDS was actually minimal and manageable, thus not driving any specific additional work for publishers, other than the necessary legal work (defining what data are to be transferred and how they are going to be used by RDS) and technical work to make sure the data are transferred correctly. No particular technical challenges were reported and some publishers indicated that the difficulty actually lay more in the initial set up to manage the transfer of data correctly than in the transfer itself. So, from the publishers' perspective, RDS did not differ from any other third-party services using bulk data.

> "I think some of the challenges are again partly down to the one-way street" (Publisher)

For one publisher who described the process in more detail, there were two particular issues to be addressed. Firstly in moving their metadata to international standards they had been partly driven by a wish to provide uniform and standardised metadata into RDS, although they would probably have done this work anyway. Secondly, they had also been obliged to add tags to their metadata to indicate that all their content was peer reviewed. The tag was necessary to ensure that academic content was not missed where peer reviewed content only was being searched within the RDS. Tags were also needed for subject fields to help with filtering content in the RDS. The subject categories or headings used by the RDS may be broader than those applied by the publishers themselves. This may lead to specialised content not being discovered.

This publisher felt that they had had to do a large amount of work themselves to understand how the RDS worked, a point that was also made by one of the content providers who was also an RDS supplier.

A not-for-profit publisher felt that they were making investments to improve the syndication of content and improve metadata to make them work better with the RDS. While this was helping libraries, it was not necessarily helping the publisher, who could see a decline in their own usage as a result of the RDS. They questioned whether this investment would make sense to a commercial publisher if it resulted in less usage.

4.2.2 RDS supplier views

As regards technical challenges, both RDS suppliers described in some detail the process involved in ensuring that the relevancy ranking worked and the results were consistent.

In making the links to full-text, the RDS supplier also has to understand how the content is presented to libraries and how the links are created to ensure that customers are getting the most accurate and up to date results.

> "This isn't just about pouring content into a huge funnel, there's a lot of work that happens, again to make sure that from a customer's perspective you are getting the most relevant content rising to the top and you've got consistency in your results." (RDS supplier)

4.3 Publisher concerns

Publishers interviewed voiced a number of concerns over their relationship with RDS suppliers.

4.3.1 Lack of feedback

One publisher indicated that although they were aiming for 100% metadata contribution, they were unsure whether they were actually achieving this target, owing to the lack of feedback from RDS providers, this same publisher qualifying the publisher/RDS provider relationship as very much a 'one-way street''.

An RDS supplier acknowledged that this could be the case, as this was a fast moving operation and usually worked smoothly.

4.3.2 Lack of visibility and understanding of how data are used

One publisher voiced the concern that the RDS provider was in a position to mine their data and those from other publishers and in this was able to gain better intelligence. There was a lack of

understanding on how the data were being used, how content was prioritised and how changing technology may be impacting on how their data were presented or used.

This publisher also felt that more focus was on the library customer than on the publisher, with library user groups but nothing similar for publishers.

4.3.3 Dilution of the brand

This same publisher also felt that their brand was hidden or lost in the search results. A user would not know that they had found the actual publisher content rather than aggregated database content until they clicked through and found the full text content on the publisher site. There were now a number of open access journals on the market which may not have the same scholarly content and this could also affect search results.

4.3.4 Lack of full understanding by libraries

Some publishers questioned whether libraries always fully understood how to set up the RDS or the link resolver that was associated with it. Usage could be affected by the way the RDS had been set up, whether default settings had been accepted or changed. One publisher found they needed to spend time with customers checking how they had set the link resolver or the RDS so that they could ensure they were getting access to all their subscribed content. It was a concern that the publishers' sales team did not always have the technical expertise to deal with this.

Another content provider had found evidence that actions at an institution may have led to usage decline, for example failure to change default settings which meant some resources did not show up. They wanted to be able to show the library how best their product would show up in the search results.

4.4 RDS impact on content usage

4.4.1 Overall usage

In the interviews, participating publishers were asked whether they felt the use of RDS had an impact on the usage of the resources they publish, be it books, journals or databases. Publishers felt that overall RDS were probably having a positive impact on the usage of their resources, both in terms of traffic and downloads, although they were not in a position to provide evidence to corroborate their perceptions.

> "It's always very difficult to pinpoint what the impact of one particular thing has been because it's multi-dimensional."
> (Case study publisher)

One publisher noted that trends could be contradictory; usage may go up or down when an RDS was introduced, but it was not possible to tell whether this was due to the RDS itself, to the link resolver or the way the library had implemented it. More generally, publishers would not be aware when a library introduced an RDS as they would be looking more at aggregated usage figures rather than figures for an individual library. Looking at figures for individual libraries was not something that publishers did regularly, though some would do occasional case studies.

It appeared that publishers have real difficulties in matching up requests or sessions with RDS activity. It transpired that they actually have little knowledge about whether traffic to their content comes from RDS, unless they investigate the data for their content at account level, i.e. for a

single institution – which is something, we understand, the participating publishers did not do on a regular basis.

It appeared that identifying the impact of a particular system, such as RDS, on the usage of their resources was particularly difficult for them, owing to the multi-dimensional nature of usage variations. Clearly, publishers were not in a position, for instance, to report a peak in usage after an RDS implementation at an institution; they felt they just would not be able to see it because this was something they were not following up very closely. One publisher commented *"I can't tell you that we see a drastic change but I don't think we monitor it very closely to notice if there has been a peak, so we wouldn't be aware that somebody had implemented a service like that."*

4.4.2 Data on traffic

The data they collect about referrals allow publishers, in some cases, to infer some information, albeit very limited. For instance, a publisher explained that if, for a given institution, it is noted that the 4th highest referral is from www.ebsco.com, they may then presume this institution works with the EBSCO's discovery service as it would seem rather unusual to see EBSCO so high up in the referral ranking for this specific publisher.

Another noted that with link resolvers and IP authentication it was very difficult to track where traffic was coming from. It also appeared from the interviews with publishers that although their perception was that RDS were probably having an impact on the usage of their resources, this impact was actually diluted compared with other discovery systems such as Web search engines - *"hugely dwarfed by the likes of Google"* as one publisher commented - or some subject-based databases which play a central role in information searching in some disciplines e.g. the Astrophysics Data System (ADS) database in astrophysics. One interesting point, however, was that publishers thought that traffic from RDS was definitely richer than, for instance, that from Google.

4.4.3 COUNTER Usage reports

From an analytical perspective, COUNTER reports were thought to be too simplistic to give useful information about the users and their information search; COUNTER reports are only designed to give the number of successful requests in a month for selected types of material. This understandably does not give much indication about the users themselves, i.e. where they come from, what they did during their visit etc. By drilling down into the data that they collect via their web logs publishers can get a better feel for both referral traffic – although this is not always easy to interpret as web logs only give information about the previous page - or for what people do in a visit (analysis of the information about visitors' behaviour in a visit, i.e. which page they are looking at, what they downloaded etc.). Publishers indicated that a richer traffic means that people are more likely to have found the right content, if they have come via RDS. This was indicated in both a lower bounce rate and a higher percentage of full text downloads within a specific referral segment.

4.4.4 Usage statistics required from RDS

Publishers had a number of suggestions for statistics and other information they would like to see from the RDS suppliers. These included:

- How many articles are available on the RDS
- Details of loading failures

- Clicks through to full text
- Clicks through to publisher version as opposed to aggregator version
- How much usage from all different sources that content is available
- Number of sessions per customer
- Usage per customer rather than aggregated usage so that it can be related to other usage records, though they recognise that RDS suppliers may be reluctant to disclose this

Comments on usage statistics from RDS suppliers

One RDS supplier was supplying usage reports to publishers on click statistics relating to search activity. Where the publisher is providing full text through indexing, then they will get click statistics by discipline and also by publication title. It was felt that this would give them an idea of traffic opportunities. Another pointed to the differing requirements of e-journal publishers, database suppliers and e-book suppliers and the need to meet all of these.

For library customers, a range of detailed reports were being provided, such as visits, top queries etc. Reports are also available by discipline, to see where resources may be lacking.

4.5 Potential challenges and issues

4.5.1 Neutrality and relevance ranking

Publisher view

Publishers were asked whether they would like to comment about RDS vendor neutrality and relevancy ranking. Not all individuals approached felt they knew enough about it or were the right person to answer this contentious question. Those who were happy to answer did acknowledge that vendor neutrality and relevancy ranking could, in theory, be an issue. It was felt that there was particularly a potential risk with those RDS vendors who were also publishers because of their mix of interests. There was an indication that publishers, in general, would actually welcome more information about the algorithms at the heart of relevancy rankings in RDS. However, despite some potentially vested interests and a certain lack of clarity about the relevancy rankings, publishers also indicated that they had not observed any problems or suspicious change in usage with paid-for discovery systems such as RDS so far.

> "In general, I don't think this is a particular area of concern … not on our list of issues or problems that we have to solve or discuss with other parties in this area."
> (Case study publisher

Conversely, taking the example of Google, which enjoys a dominant position in information searching and indexing, and for which referral traffic to publisher platforms is huge, they did mention that they could observe the impact of their changes in the ranking algorithm; and this was a real challenge for them. One publisher actually commented that publishers have become highly dependent of Google and as such *"[they] are at risk of one particular company and [Google] really do[es] dwarf everyone else – [they] don't see anywhere near the level of usage from any other service as we do from [Google]. It's a very interesting topic and one that's high on [their] agenda for virtually every new development [they] are looking at."* In other words, although publishers were fully aware that vendor neutrality and relevancy ranking could be an issue, they did not perceive it as an immediate and real concern or threat.

RDS supplier view

Although as stated above, publishers acknowledged that there was no evidence of business relationships that may be affecting content ranking, RDS suppliers also supported the call of ODI for more transparency.

Transparency and neutrality were seen as critical, "*this is a completely neutral scenario for us"* was a comment from one RDS supplier. There was no interest in where the user was directed to, with this seen as an issue for the library and how it had configured the link resolver.

> "Competition should not impact on the vendor neutrality. The onus is on the vendor to deliver a service that is transparent, open, accessible and understandable to both the institution and the user so that they can question the validity or accuracy of the service."
> (RDS supplier)

4.5.2 RDS Integration with other products

As noted above (Section 3 – 3.5.2 Vendor rivalries), libraries had often found it preferable to buy an integrated suite of products from the same supplier rather than using Library Management System (LMS), link resolvers and RDS from different sources. Asked about how well their RDS integrated with other products, one supplier stressed the importance of integration and acknowledged that there were advantages in terms of work flow management in having an integrated system with just one supplier. On the other hand, they stressed the flexibility of their system and the way it was designed to integrate with any LMS that the library might choose. Another also spoke of their open, collaborative approach with Integrated Library system (ILS) vendors and others in the information supply chain and cited customers who used their product with a number of different ILS and link resolvers, stating that while integration had its advantages, the institution needed to be in a position to take advantage of new developments in RDS, LMS or link resolver technology.

Although the immediate benefits for libraries were obvious and non-negligible - a full suite of products from a single vendor offers a simple solution to manage electronic resources - libraries may be at risk if they lock themselves into the ecosystem of a particular vendor. This issue - raised in a stakeholder interview - may have implications in the long-term, particularly in relation to libraries' ability to keep pace with technological developments and user information behaviours. One stakeholder indicated that the provision of information has been highly disrupted by the Web and libraries' services and systems remain vulnerable. If libraries want to remain relevant in the age of mass electronic information, they need to adapt quickly to change, or even drive change, and this often requires full control over the way they operate their business. If libraries are tied up in a particular ecosystem, they are dependent on the services and functionalities the vendor is ready to develop. Libraries may not necessarily have the same priorities in terms of service development for their users. The adoption of a full suite of products today may have direct implications on libraries' ability to have full control over their IT strategy tomorrow. It is, therefore, important for libraries to have a clear understanding of what it means for them to move to a particular ecosystem and clear exit strategies in place to allow them to switch systems to meet their ever-evolving needs, as well as those of their users

4.5.3 Starting point for research

One content provider felt that platforms that had previously had a lot of direct use because they were well known may in fact see usage decline when libraries started marketing the RDS and usage got driven to a wider range of resources depending on how the library had set up preferences. He felt that smaller publishers whose brands were less well known may see more benefit.

Publishers recognised that it was important for libraries to promote the RDS and encourage use of its own subscribed content, but they questioned also how many users actually started their research with the library site rather than with Google, Google Scholar, or, for more advanced researchers, with specialised databases.

> "The Discovery service should be a tool that facilitates all users effectively."
> (RDS supplier)

While usage statistics cannot indicate who the RDS users actually are, publishers generally acknowledged that the main users would probably be undergraduate students.

On the other hand, one RDS supplier suggested that in interdisciplinary areas or in areas fringe to their research, researchers may also prefer to start their search with the RDS. Another felt that the RDS should be able to deal with both undergraduate searching and the more complex search strategies that researchers would expect.

4.5.4 Effect on A&I databases

The effect on specialised A&I databases was especially interesting. All those interviewed, including content providers who were also RDS suppliers, felt that there was still an important place for these to exist alongside the RDS and that researchers were likely to start with these in their specialised subject area.

> "Their high quality subject indexing and available backfiles cannot be replicated or replaced. We see each A&I database as a mini-discovery service for its subject area, and by finding ways to leverage their strengths we have been able to partner with them to create one comprehensive discovery service."
> (RDS supplier)

4.5.5 Costs and benefits to libraries?

While all publishers and content providers recognised the benefits for libraries of implementing RDS, one suggested that libraries should also look for the return on investment, and decide whether these represented a good use of money in times of scant resources. Another suggested that with less staff time to spend on information skills training with students, libraries could gain from directing students to the one stop search with which they were already familiar.

One content provider also felt that libraries should also look to the needs of academic staff and researchers as well as students. There was evidence that these groups were less likely to start their search with the library, preferring specialised databases or even Google.

There was a perception from one stakeholder that electronic journals were a resource of choice and RDS were particularly geared towards this type of resource, although the usage analysis did show that e-books may actually have benefited more from RDS than journals. This stakeholder commented that maximising the exposure of local library resources, e.g. some digitised resources or other non-typical resources, and making sure that those local resources were discoverable via the RDS, could require significant time and effort from the library but bring only limited benefit, as the RDS system itself was geared towards more main stream academic publications such as journals or e-books. This raises the question of what resources (material and metadata) the library wants to make available via the RDS and how much staff and financial resources the library is ready to allocate to this task. Populating the discovery database does not in itself suffice to make local content well surfaced; additional library developments are required to ensure that local content is discovered and used.

5 Summary and recommendations

The primary object of this research was to evaluate the impact that library discovery technologies have on the usage of academic resources. The aim was to provide a usage analysis based on libraries and publishers' usage data pre and post-implementation of RDS.

From the outset it was recognised that this would be a small-scale UK study, with only six HE libraries taking part in the case studies. Despite this, the strength of the study lies in the fact that the usage analysis is complemented by a UK-wide survey of HE libraries and in-depth interviews with librarians, publishers, content providers and other stakeholders in the information supply chain, including RDS suppliers. This provides the necessary contextual information to inform the interpretation of the data, as well as showing a range of perceptions and views on the topic of RDS impact on content usage.

Our initial survey of UK HE libraries showed that just over 77% of survey respondents had already implemented an RDS at their institution, and a further 11% reported planning to implement one at the time of the survey, providing a clear indication that UK HE libraries are confidently moving to an RDS environment. This makes the study particularly timely, in that it provides an overview of the current benefits and challenges faced by libraries, publishers, content providers and other stakeholders in the information supply chain, and offers a set of recommendations for each stakeholder group to best support the discovery and use of academic resources via RDS systems.

5.1 The case for investment with library discovery technologies by libraries

5.1.1 Success and attraction for libraries

The one-stop shop experience offered by RDS was regarded as a major step forward in terms of enhanced user experience. Access to almost all library resources through a single interface linked to full text was perceived as meeting the demands of students, particularly those of undergraduates. For this reason, the participating libraries were highly satisfied with their RDS and with the way users could search across resources and retrieve quality academic content.

The fact that the library's search box could be embedded in various user environments such as the library webpage, Virtual Learning Environment (VLE), departmental webpages, reading lists etc. was seen as a great functionality and raising the profile and the visibility of the library.

RDS also seem to enable libraries to make better use of their resources as they get surfaced, discovered and accessed via the RDS, although this was not necessarily seen as the primary motivation for moving to a library discovery system.

5.1.2 Have RDS resulted in growth in content usage?

The findings of the usage analysis suggest little uniformity in the patterns of content usage following the implementation of the RDS at each case-study library, with only e-book usage showing similar trends across all libraries. Furthermore, context is paramount when looking at content usage data, making it even more challenging to isolate the contribution of RDS to usage of academic resources. The electronic content environment is a multi-dimensional space where many variables can have a profound effect on usage – this created a lot of noise in the results, making it a complex task to identify the sole impact of RDS on content usage. Based on recent

SCONUL returns[21] there is an indication that UK libraries are moving away from print and are buying more electronic content, at a faster pace, so it is likely that a significant increase in provision of electronic content is driving usage up. There was a perception amongst case study libraries that users have a strong preference for electronic access to academic content and the more libraries provide electronic content, the more users consume it.

> "I think that's a hard question to answer because my sense would be for some of the platforms that get a lot of use […] it's probably not increased usage, in fact usage has probably declined. I think for smaller publishers it has probably created greater exposure for their content and perhaps their usage has gone up."
> (Stakeholder)

The issue of noise in the usage data was partially addressed by looking at the usage of a set of constant resources, i.e. those which had recorded usage in each month over the period studied. This controlled, as much as possible, for any increase in newly subscribed content, although other variables may affect usage, such as user behaviour, promotion of specific resources by the library or by academics, e.g. via reading lists etc.

Based on the constant titles analysis, the key findings from the usage analysis are:

1. There is no straightforward answer on the impact of RDS on the usage of academic resources, but overall there is a suggestion that they do have a positive influence on usage.
2. The effect varies according to the type of resources.
    - **E-journals:** RDS may have had some impact on e-journals, albeit limited.
    - **E-books:** there seems to be a positive impact on e-book usage. However, factors such as greater appetite for new formats among users and different patterns of use compared to e-journals may be a factor. Their inclusion in reading lists may also be a driver for increased use. It is, however, highly likely that RDS have had an influence in the discoverability and usage of e-books.
    - **Databases:** the findings about the impact on databases are inconclusive and require further research; the effects vary between libraries and across databases.
3. The possible impact of RDS on usage varied greatly from one case study library to another. No common pattern could be identified across libraries, with the exception of increased e-book usage, although the extent of the growth varied across libraries.
4. The possible impact of RDS on content usage also varied greatly between resources within libraries. This is discussed further below.

These findings are supported by those of Levine-Clark, McDonald & Price whose paper at the recent Charleston Conference[22] confirmed that analysing usage is a complex issue. Their research has so far demonstrated an inconclusive picture of the impact of RDS on the various stakeholders. Their study showed variation by institution and by publisher within each RDS, some showing increase and some decrease in usage.

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[21] SCONUL, Annual Library Statistics, ISSN 1352-1020.

[22] Levine-Clark, Michael, John McDonald, and Jason Price, "Discovery or Displacement? A Large Scale Longitudinal Study of the Effect of Discovery Systems on Online Journal Usage," Charleston Conference, November 7, 2013.
http://www.slideshare.net/MichaelLevineClark/mlc-jdm-jsp-charleston-2013-slideshare-28161600

The quantitative findings were echoed in the stakeholder interviews. Stakeholders generally reported that their perception was that RDS would help discover content and consequently increase usage, although it was acknowledged that this was largely based on assumptions, with little evidence available to date.

It is important to emphasise that this study does not show a causal link, but rather a positive association between the introduction of RDS and increased usage. Further research is needed to explore the nature and extent of the link between RDS and the observed increase in content usage.

5.1.3 The ecosystem perspective: advantages and disadvantages

Libraries use a multitude of products from different vendors to manage their electronic resources, both at the back and front end, e.g. LMS, ERM, link resolvers etc. Interoperability between systems was identified as a recurring issue, and most case study libraries had moved to a single suite of products in line with their RDS supplier in order to achieve a better integration of their systems. This was generally perceived as a necessary move to manage holdings of and access to electronic resources more easily and successfully.

An issue for libraries to consider when adopting of a whole suite of products from the same vendor is the extent to which they are actually tying themselves up in an ecosystem from a particular vendor. This may have implications on libraries' capacity to adapt to change, or drive change in the future. This is why clear exit strategies need to be put in place to enable libraries to switch systems easily to adapt to change, be it technological change or changes in user behaviour.

5.1.4 Should libraries invest in discovery layers?

There are undeniable benefits from having a discovery layer, and participating libraries were unanimous in their views that moving to an RDS solution was essential to their activity in terms of providing an enhanced user experience and exposing (and managing) better the resources to which they subscribe. The study found that with a single interface linked to full text and where searches could be conducted across almost all resources the user experience has been dramatically improved. The usage analysis also suggests that there seems to be a positive association between RDS use and increase in usage for e-books, and to a lesser extent for e-journals. The findings for databases were inconclusive. This does not imply causality, although it is likely that RDS use accounts for some of the increase in usage for e-journals and e-books.

Although RDS bring great benefits to library users, there remain some challenges hindering the full take-up of RDS benefits. The survey and case study findings particularly highlighted the issue of gaps in content coverage. Libraries felt that those gaps were often the consequence of some publishers and content providers not engaging with RDS and, in some cases, the result of the complex contractual relationships that have emerged between some RDS suppliers and some content owners and providers. These were often perceived as vendor/publisher rivalries, leading to non-contribution of metadata to competing RDS. This lack of co-operation was certainly a source of frustration for participating libraries, both in the case studies and in the survey. Another challenge highlighted in the study was the lack of clarity in content coverage provided by RDS suppliers.

An ever-growing proportion of library users (students, academics, researchers) start their information search journey directly on general search engines, such as Google or Google Scholar, rather than using the library catalogue to start their searches. The variable quality of results retrieved on the open Web is certainly seen as a driver for providing library users with a more positive Google-like experience, with natural language searching, across quality academic resources. One question that may arise is whether RDS are a good or poor substitute for general search engines. In the light of this, and the literature on user searching behaviours, libraries may wish to consider whether investment in RDS or in Search Engine Optimization (SEO) would bring greater returns.

Furthermore, there was also an indication that libraries often consider their RDS as a starting point for a search and therefore as particularly adapted to the needs of undergraduate students. Although some libraries did promote their RDS to all their users, others admitted that academics and researchers may still need to access and search individual resources for in-depth information. This aspect needs to be considered when a library promotes its RDS and tends to hide its previous online catalogue as well as access to individual resources, such as databases.

One stakeholder suggested that libraries may have jumped on the RDS bandwagon hastily as the service may not quite yet deliver the full promise of the one-stop shop. The academic resources sector was at the cusp of something new in relation to information discovery but there was no clear evidence yet that the return on investment would be high enough to justify a swift adoption of RDS solutions, but libraries might prefer to wait and see where this is going. This raises the issue of whether libraries can actually adopt a wait and see attitude. Although there is no clear case to invest significant resources in RDS, libraries feel that they need to be perceived as doing something, adopting a forward-looking attitude and going the extra mile to serve their users because of user expectations and the fierce competition in the sector.

Libraries considering investing in RDS may want to approach this in terms of a cost-benefit analysis. There is a significant cost associated to buying an RDS. Most libraries indicated that the RDS system they bought was not quite the instantly accessible product they had expected and some additional configuration work (staff time and effort) was often required to meet their local circumstances and specific needs. In addition, the inclusion of non-mainstream resources, such as local digitised resources from a special collection, in an RDS may require additional resources to make those resources discoverable and accessible (e.g. creation of additional metadata etc.). There is a non-negligible cost to making the RDS work the way the libraries want it to work and fully exploiting the potential of RDS as well as maximising the benefits the system can offer. Libraries need therefore to consider carefully how much resource they are ready to assign to this.

Recommendations for libraries

- The library community as a whole should work with bodies such as SCONUL and RLUK, with the support of UKSG and Jisc, to consider ways of:
  - ✓ Empowering libraries to drive service development within the RDS community
  - ✓ Strengthening the library community voice to ensure that RDS suppliers and content providers are providing end users with the best information discovery experience and that issues such as transparency, neutrality and relevance ranking are dealt with in a way that is acceptable to the community
  - ✓ Ensuring that RDS suppliers and content providers are providing content information and usage statistics in a way that enables libraries to fully understand and assess the value of the RDS system and of the resources it indexes
- Libraries should consider the issue of interoperability between products from different vendors, and the long(er)-term risks and benefits associated with moving into a particular vendor's ecosystem, i.e. having a whole suite of products from a single vendor.
  - ✓ Making sure libraries have adequate exit strategies
- Libraries should work closely with RDS suppliers and content providers to gain a better mutual understanding of how minor changes in the RDS settings may affect usage of certain resources.

5.2 The case for engagement with library discovery technologies by stakeholders in the academic information supply chain

5.2.1 Competition vs. cooperation

Library discovery technologies have generated complex contractual relationships between the various stakeholders in the academic information supply chain, not the least because some RDS suppliers are also content providers. There are two aspects behind the tensions that have been observed between those RDS suppliers that also have an interest in the publishing sector.

Firstly, RDS suppliers could be perceived as competing directly with content providers. The 2012 NFAIS survey[23] highlighted the perceived threats and opportunities generated by RDS systems for publishers and content providers. Overall, from the publisher and content provider perspective in our study, there is a perception that RDS may help enhance discoverability and visibility of content. This is supported by findings from the NFAIS survey, in which survey respondents (content owners and providers) indicated a perceived broad exposure of content

[23] NFAIS (n.d.) Survey comparisons on discovery service participation and perceptions: 2010 and 2012. Available at: http://info.nfais.org/info/Survey_2010_2012_Comp.pdf

and an increase in usage with RDS. This was however weakened by a series of concerns, including the dilution of the brand within the RDS, low search result rankings, loss of search parameters and decreased usage on native platforms. In our study, dilution of the brand was also perceived as an issue; other perceived challenges included the lack of feedback and communication from RDS suppliers, lack of visibility, and poor understanding of how the data is being used within the RDS, including issues surrounding the relevancy ranking and vendor neutrality, and the work required by some publishers and content providers on their metadata to achieve improved discoverability by the RDS. The relationship with RDS suppliers was generally perceived as a 'one-way street' by the publishing sector, with very little communication and feedback from RDS suppliers to contributors. Publishers and content providers had concerns that they were not being served well by RDS providers who were thought to be primarily concerned with their library customers.

Secondly, some RDS suppliers have parent/sister companies in the publishing industry. It is the library sector's belief that these companies do not always feed data to a 'rival' RDS, on the basis that they have competing interests, thus failing to offer their customers (libraries) the full benefits of a discovery layer through a maximised content coverage. Libraries had on numerous occasions, via the survey and the case studies, commented on the difficulty of the situation they found themselves in, when dealing with competing vendors/content providers. One example of this is the on-going issue concerning exchange of metadata between two of the major RDS suppliers who are also content providers. It is our understanding that the parties have initiated communication to move the situation forward, although the confidential nature of such communication means that this cannot be verified at this stage. Such development will be welcomed by the library sector.

5.2.2 Realising the benefits

While libraries generally see an increase in journal downloads following the implementation of RDS, the picture for individual publishers is more mixed, with no indication of a clear pattern emerging from the data. In addition, the results from our usage analysis were very different across publishers and content providers. With regard to journal usage, there was an indication that RDS may positively affect journal usage to a greater extent for smaller publishers by providing greater exposure to their content whilst RDS may affect usage a little or even negatively for bigger publishers or content providers. Further research with a dataset including a greater number of publishers may bring a better understanding of the impact of RDS on journal usage, at publisher level.

From the publishers and content providers' perspectives, usage was also highly dependent on the settings within each RDS system, both the default settings and any changes made by individual libraries, which could have drastic repercussions on publishers and content providers' usage. Libraries were often unaware how such local changes of individual settings could affect publishers and content providers.

E-book usage data appeared to have accelerated in the case study libraries following RDS implementation. The publishers participating in this study did not include any major e-book providers, so that there were insufficient usage data to investigate the impact of RDS from the providers' perspective. This is an area which warrants further research.

Case study participants across the different stakeholder groups reported their concerns over the potentially negative impact of RDS on the survival of databases, particularly A&I databases, regarded as very important for discipline-specific in-depth searching. The database usage

analysis was however inconclusive. The picture was very varied across the various databases included in the research – including both full text and metadata only databases. The data received led the research team to suspect an element of multiple counting happening within the RDS system for each single keyword search, artificially inflating overall usage from the library's perspective. Additional research on the impact of RDS on the usage of databases is recommended, to provide an in-depth evaluation of the impact of RDS on A&I databases in particular, which are a source of rich metadata for in-depth information searching and are, sometimes, perceived as being supplanted by RDS systems. Any future research will be aided by the COUNTER release 4 requirement which vendors are required to comply with by 31 December 2013. The DB1 report which previously asked for data on searches and sessions will now require data on searches, result clicks and record views. This should provide more meaningful data on database use.

Publishers and content providers generally welcomed library discovery technologies such as RDS, although traffic via those discovery layers remained marginal compared to the traffic coming from general search engines. Traffic coming via RDS was, understandably, very focused (i.e. a lower bounce rate). Visibility and discoverability of content was identified as a key motivation for publishers and content providers to contribute their metadata. Publishers and content providers were very much in a phase of observation to see how this might develop in the future.

Leaving aside the argument in favour of no discovery layer at all, RDS systems offer a unique opportunity for libraries to maximise the discovery of their digital resources and collections by replicating - if not enhancing - the Google experience that students, and to some extent researchers, are familiar with. There are definitely opportunities for all parties to provide an improved user experience in relation to the discovery of academic content; despite the roadblocks and issues that need to be overcome to make it successful for HE libraries, readers of academic content and content owners/providers.

Some recommendations are provided below to help improve the current situation, encourage RDS suppliers to continue in dialogue with publishers and libraries, and encourage publishers and content providers to engage more with library discovery technologies and move the discovery of academic content forward via RDS.

Recommendations for RDS suppliers

- Work towards an open communication with interested parties (libraries and content owners/providers), particularly on the following points
  - how individual discovery systems work
  - how this can affect the resources of individual publishers/content providers
  - how the relevancy ranking is derived
  - how metadata are being used in the RDS
- Work with libraries and publishers together to make them understand how RDS settings (customisable by libraries) can affect how some publisher content is surfaced
- Consider user testing for publishers to make sure that their content is surfaced adequately
- Address publicly the issue of vendor neutrality and any potential commercial bias in the indexing of content within the RDS
- Provide libraries with clearer information about what is indexed by the RDS
- Provide the parties involved in RDS with usage reports from RDS (including publishers)
- Consider and act upon the recommendations of ODI and NFAIS

Recommendations for publishers and content providers

- Publishers and content providers to work more closely with both libraries and RDS suppliers to make sure the RDS settings are optimised for the discoverability of their content
- Publishers and content providers to request feedback/communication from RDS suppliers

5.3 The role of other stakeholders

The findings of the study indicated that it is still early days for libraries, and most have not yet reached the point where they are able to routinely analyse the usage data they have at their disposal. Libraries appear to be focussed on RDS implementation and development, and do not seem to have the time (and/or resources) yet to evaluate the impact of their RDS on content usage. Similarly, it is still early days for publishers and content providers. In-house usage analysis for traffic specifically coming from RDS is a complex matter; this is because publishers and content providers cannot easily detect whether traffic is mediated via an RDS. There is, therefore, still very little knowledge of the impact of RDS for publishers and content providers and this warrants further research.

A number of current initiatives may help both libraries and publishers/content providers with analysis of usage and identification of content. These include:

- COUNTER release 4 and in particular the additional data required for database reporting (DB1); evidence of more vendors providing COUNTER compliant data particularly for e-books and databases.
- JUSP, a Jisc-funded service that assists libraries in collection and analysis of e-journal usage and possible future extension to e-books and databases.
- KB+, the Jisc-funded shared service knowledge base to support libraries in the management of e-resources.

This research commissioned by UKSG, with Jisc support, is timely as the implementation of RDS systems is growing at a rapid pace in the UK, and very little is known about the impact RDS have on the usage of academic content. This study therefore fills an important gap. The study outlined the opportunities offered by RDS, but also a number of caveats that are currently seen as major obstacles hindering the full potential of discovery layers such as RDS systems.

Supplementing recommendations for HE libraries, publishers, content providers, and RDS suppliers, below is a series of recommendations for other stakeholders in the information supply chain. We believe those recommendations may help representative bodies to influence and shape the future of library discovery technologies.

Recommendations for other stakeholders in the information supply chain

Data, activities and initiatives

- UKSG and Jisc to follow closely developments led by COUNTER 4, notably in the area of database usage figures required from content providers from January 2014 onwards to monitor whether this leads to more meaningful database counting
- UKSG and Jisc to encourage initiatives such as KB+ and JUSP to find ways of reporting on usage and content coverage that take account of library usage of RDS suppliers and link resolvers
- COUNTER to consider developing a COUNTER code of practice for RDS usage data.
- COUNTER, NISO, ODI to work together to establish industry standards and encourage RDS suppliers to take notice of those developments

Additional research

(to be led by national and sectorial bodies representing HE libraries, publishers, content providers and other stakeholders)

- Support further detailed usage research, including:
    - a matched control group
    - a more extensive dataset (richer data)
- Support new research into the impact of RDS on eBook usage from the publishers' perspective
- Support further detailed research on the impact of library discovery technologies on the usage of databases, particularly A&I databases.
- Support user-based research investigating information seeking behaviours with particular reference to RDS

Appendix A: Methodology

The aim of this project was to assess the impact of library discovery technologies on the usage of academic content. The project started in July 2013 and is due to complete by the end of the year. The project consisted of three phases. A survey of UK higher education (HE) libraries was conducted in phase 1, a series of case studies of libraries and publishers in phase 2, and finally, a series of stakeholder interviews in phase 3.

An initial literature review informed the survey questions, and helped in identifying publishers and stakeholders for the case studies and interviews.

Phase 1: survey

Phase 1 consisted of a Web-based survey of UK HE libraries, which was created and administered using the Bristol Online Survey software. Invitations to complete the survey were sent to library directors on behalf of the project team by SCONUL (the Society of College, National and University Librarians).

The objective of this first phase was twofold. Firstly, the questionnaire enabled the research team to map the RDS landscape within HE libraries and gauge the number of libraries who were already using RDS, or thinking of implementing it in the near future. It also provided some useful detailed information, which contributed to the development of the questions for the telephone interviews in the subsequent phase. Secondly, the survey of UK HE libraries offered an opportunity for libraries to volunteer and take part in the second phase of the project, and be contacted at a later stage. To take part in the upcoming case studies libraries were required to provide two years pre-RDS implementation and two years post-RDS implementation usage data for analysis. This usage data analysis forms the core of the study.

The survey ran from 22nd July to 9th August 2013. Survey responses were received from a wide range of HE institutions, providing a good mix of teaching-led and research-intensive institutions. A total of 62 usable responses were received, including two from national libraries, one special library, and one HE college in the Republic of Ireland. These have been included in the overall analyses presented in this project report.

Phase 2: case studies

For the second phase of the project, 6 libraries were recruited for the case studies via an expression of interest from the survey; in addition, a range of publishers were approached and 5 agreed to take part in the study. Case study libraries and publishers were required to provide COUNTER compliant monthly aggregated usage data for e-books, e-journals and databases for the period 2008-2012 and for 2013 to date. The usage analysis was supplemented with in-depth interviews with electronic resources librarians and publishers to gather their own views on and experiences of RDS. The usage analysis for the case study libraries was supplemented with useful contextual data retrieved from the SCONUL statistics *(Table 1).*

Libraries supplied a range of usage data, covering journal downloads, e-book section requests and database searches for a period for at least two years before and two years after implementation of their RDS. Each library's data were analysed individually, including figures received directly from the case study publishers, and a summary sent to the library for comment.

Data usage followed the cycle of the academic year, with higher usage during term-time months, and lower usage over the summer period in particular, most notably for e-books. Figures presented in this report are based on a 12-month moving average (i.e. the average usage over the preceding 12 month period). Further, in order to facilitate comparison and interpretation, institution size has been taken into account by taking usage per FTE student [24]. As libraries had different dates of implementation of their RDS, for this report, data have been re-configured to record time relative to the month of RDS implementation, and all graphs are presented relative to the month of RDS implementation in each library.

- The trend for usage in month m is calculated as the average usage for the 12 months up to and including month m.
- Usage per FTE student in month m is this figure divided by the number of FTE students as reported to HESA for the 2011-12 academic year.
- Relative usage per FTE student in month m is the difference between this figure and the usage per FTE student in the month in which the RDS was implemented. These are the figures illustrated by the graphs in this report.

Table 1 Contextual data for case study libraries

Case study libraries	FTE students*	E-resources purchased*		
		Serials	E-books	Databases
A	15,700	38,000	105,000	120
B	10,000	14,700	2,700	135
C	12,000	15,000	445,000	50
D	22,500	54,700	7,700	70
E	18,500	27,500	545,000	260
F	28,700	26,000	133,000	180

*Rounded figures
Source: SCONUL Annual Library Statistics 2011-12

Representatives from the libraries and publishers also took part in semi-structured telephone interviews.

Phase 3: stakeholder interviews

Phase 3 consisted of a series of stakeholder interviews. The aim of this last strand of research was to obtain stakeholders' views on the topic of RDS. The stakeholder interviews were intended to supplement the evidence from library and publisher case studies and provide a broader view of the RDS environment. Stakeholders included two RDS suppliers and one content provider who had researched this area more widely. The work was placed in the context of other Jisc work in an interview with a Programme Manager in the Digital Infrastructure team.

[24] FTE student data obtained from HESA, as reported in the 2011-12 *SCONUL Annual Library Statistics*. For the institutions included here, there have been no major changes in student numbers over the period considered.

Appendix B: Survey questionnaire and summary of quantitative responses

UKSG survey questionnaire



Page 1 of 4

Introduction

We have been commissioned by UKSG and Jisc to investigate the impact of Resource Discovery Systems (RDS - for example Ebsco Discovery Service; Primo; Summon; etc.) on resource usage. The aim is to obtain a broad overview of the current position with regard to adoption of RDS, as well as assessing the impact for individual libraries and resource providers. To this end, we are conducting a survey of UK HE libraries, which will be supplemented with case studies of both libraries and resource providers.

We would be grateful if you could take a few minutes to complete our survey - even if you do not use a Resource Discovery System, this will be useful data for our research. All data will be treated confidentially, and no institutions will be identified in the analysis and reporting of the survey results. The closing date is **9 August 2013**.

UKSG Jisc Loughborough University LISU Evidence Base

Continue >

1. Institution

2. Has your library implemented a Resource Discovery System?

- ○ Yes
- ○ Not yet, but we are in the process of doing so
- ○ No

If no, please tell us of any particular reasons why not, then scroll to the bottom of the page and click on continue

If you are in the process of implementing a RDS, please answer as much as you can about your proposed system.
We appreciate that not all the questions are relevant in this context.

3. Which RDS do you currently use?
(select all that apply)

- ☐ AquaBrowser
- ☐ Blacklight
- ☐ Ebsco Discovery Service
- ☐ Encore
- ☐ Endeca
- ☐ FAST
- ☐ Primo
- ☐ Summon
- ☐ VuFind
- ☐ WorldCat Local
- ☐ XC
- ☐ Other *(please specify)*:

4. When did you implement it? *(month & year)*

5. Please outline your major reasons for choosing this particular tool?

6. Approximately what proportion of your local collections are included in the RDS?

- ○ 100%
- ○ 90%
- ○ 80%
- ○ 70%
- ○ 60%
- ○ 50%
- ○ Less

7. Which types of resource are included?
(select all that apply)

- ☐ Print book collection
- ☐ Subscribed e-books
- ☐ Print journal collection
- ☐ Subscribed e-journals
- ☐ Newspapers
- ☐ Subscribed databases
- ☐ Institutional repository
- ☐ Other digital documents
- ☐ AV and other physical materials
- ☐ Open access resources
- ☐ Special materials/Rare book collections
- ☐ Other *(please specify)*:

8. Are there any resources you have chosen not to include in your RDS?

- ○ Yes
- ○ No
- ○ Don't know

If yes, please say which, and why

9. Please add any comments on questions 6-8 *(Optional)*

10. What kinds of statistical data do you keep on use of resources discovered via this tool?
(select all that apply)

- ☐ Hits
- ☐ Full text downloads
- ☐ Searches
- ☐ Referral points

☐ It varies depending on the type of resource
☐ Other *(please specify)*:

11. Do you use any analytic software to analyse usage data *(e.g. built-in tools; Google analytics; etc)*

○ Yes
○ No
○ Not sure

If yes, which tools do you use?

12. Do you compare trends in data relating to usage of the RDS (such as numbers of visits and searches) with sources that show actual usage of the target resources themselves?

○ Regularly
○ Occasionally
○ Never
○ Don't know

13. What other sources of usage data do you use?
(select all that apply)

☐ COUNTER JR reports
☐ COUNTER BR reports
☐ COUNTER DB reports
☐ Shibboleth/Athens log-ins
☐ Other *(please specify)*:

14. Please add any comments on questions 10 - 13 *(Optional)*

15. Has the introduction of this RDS affected resource usage immediately after implementation?

○ Increased a lot
○ Increased a little
○ No change
○ Fell a little
○ Fell a lot
○ Don't know / too recent to tell

16. Has the introduction of this RDS affected resource usage in the longer term?

○ Increased a lot

- ○ Increased a little
- ○ No change
- ○ Fell a little
- ○ Fell a lot
- ○ Don't know / can't remember

17. Has any change in usage been more marked for some types of resource than others?

- ○ Yes
- ○ No
- ○ Don't know

If yes, please specify

18. Do you consider the RDS to be a replacement for your previous online catalogue?

- ○ Yes
- ○ No
- ○ Not sure

19. Do you continue to offer access to your previous online catalogue?

- ○ Yes
- ○ No
- ○ Don't know

20. How close is the match between the resources your library licenses and those that the RDS includes in its unified index?

- ○ 100%
- ○ 90%
- ○ 80%
- ○ 70%
- ○ 60%
- ○ 50%
- ○ Less
- ○ Don't know

21. Do you have a federated search component in your discovery service?

- ○ Yes
- ○ No
- ○ Don't know

22. How satisfied are you with the publishers' content as offered by your RDS provider?

- ○ Very satisfied
- ○ Quite satisfied
- ○ Neither satisfied nor dissatisfied

○ Dissatisfied

Please give reasons for your answer

23. Have you identified any gaps in the content offered by your provider?

○ Yes
○ No
○ Don't know

If yes, please specify

24. Do you feel that the content offered by your provider is on a neutral basis?

○ Yes
○ No
○ Don't know

25. Do you encourage user interaction within the RDS such as tags, reviews, rating, etc.?

○ Yes
○ No
○ Don't know

26. Do you offer mobile access to the RDS?

	Via an app	Via modified html
a. Android	☐	☐
b. Blackberry	☐	☐
c. iPhone	☐	☐
d. Tablets	☐	☐
e. None	☐	☐
f. Other (please specify below)	☐	☐

27. If you selected 'Other' in question 26, please specify here:

28. Do you offer access to the RDS via social media?
(select all that apply)

☐ Facebook
☐ Twitter
☐ None
☐ Other *(please specify)*:

29. Please add any comments on questions 25 - 28 *(Optional)*

30. What, if any, feedback have you received from users about the RDS?

31. Please indicate your level of agreement with the following statements about users' perceptions of RDS

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
a. The RDS makes better use of our subscription services than our previous system	○	○	○	○	○
b. Users find the RDS easy to use	○	○	○	○	○
c. The RDS works better for undergraduates than postgraduates / researchers	○	○	○	○	○
d. The RDS supports our aim to provide a unified user experience in discovery	○	○	○	○	○

Note that once you have clicked on the **CONTINUE** button your answers are submitted and you cannot return to review or amend this page

Continue >

32. If you have any further comments about RDS, please add them here *(Optional)*

33. Are you happy to be contacted with any follow-up questions on your responses? If so, please provide contact details:

- ○ Yes, I am happy to be contacted
- ○ No, please do not contact me

a. Name

b. Email

c. Phone

Case studies

34. We are looking for up to 8 libraries to take part in case studies. Libraries will ideally need to provide usage data for their resources for two years pre- and post-implementation of their RDS, and take part in a telephone interview about their experience. Each case study library will receive a short report on the findings. Please tick below if you would like to receive more information about participating in a case study, and provide details for the most appropriate person to contact in the first instance:

- ○ Yes, I would like to receive more information about participating in a case study and have provided below details for the most appropriate person to contact in the first instance
- ○ No, I do not wish to participate in a case study

a. Name

b. Email

c. Phone

Contact details supplied will be used only in connection with the current research project

Thank you for your time

Note that once you have clicked on the **CONTINUE** button your answers are submitted and you cannot return to review or amend this page

Summary of quantitative responses

Q2 Has your library implemented a Resource Discovery System?

	No. of responses
Yes	48
In process	7
No	7
Total	62

Q3 Which RDS do you currently use?

	No. of responses
AquaBrowser	1
Blacklight	1
Ebsco Discovery Service	14
Encore	2
Endeca	1
Primo	15
Summon	21
VuFind	1
WorldCat Local	1
Other RDS	1
Total	58

Q4 When did you implement it?

Year	No. of responses
2007	1
2008	2
2009	1
2010	7
2011	12
2012	18
2013	14
Total	55

Q6 Approximately what proportion of your local collections are included in the RDS?

	No. of responses
100%	8
90%	22
80%	9
70%	8
60%	2
50%	3
Less	0
Total	52

Q7 Which types of resource are included?

	No. of responses
Print book collection	51
Subscribed e-books	52
Print journal collection	49
Subscribed e-journals	54
Newspapers	40
Subscribed databases	48
Institutional repository	30
Other digital documents	13
AV and other physical materials	36
Open access resources	41
Special materials/Rare book collections	20
Other material included	5
Total responses	54

Q8 Are there any resources you have chosen not to include in your RDS?

	No. of responses
Yes	25
No	28
Don't know	1
Total	54

Q10 What kinds of statistical data do you keep on use of resources discovered via this tool?

	No. of responses
Hits	24
Full text downloads	26
Searches	39
Referral points	6
It varies depending on the type of resource	13
Other data kept	11
Total responses	50

Q11 Do you use any analytic software to analyse usage data?

	No. of responses
Yes	31
No	20
Not sure	3
Total	54

If yes, which tools do you use?

	No. of responses
Built-in tools	12
Google Analytics	17
Other	13
Total responses	31

Q12 Do you compare trends in data relating to usage of the RDS (such as numbers of visits and searches) with resources that show actual usage of the target resources themselves?

	No. of responses
Regularly	3
Occasionally	30
Never	10
Don't know	9
Total	52

Q13 What other sources of usage data do you use?

	No. of responses
COUNTER JR reports	43
COUNTER BR reports	31
COUNTER DB reports	36
Shibboleth/Athens log-ins	21
Other usage data	11
Total responses	51

Q15 Has the introduction of this RDS affected resource usage immediately after implementation?

	No. of responses
Increased a lot	14
Increased a little	10
No change	2
Fell a little	2
Don't know	25
Total	53

Q16 Has the introduction of this RDS affected resource usage in the longer term?

	No. of responses
Increased a lot	11
Increased a little	7
No change	2
Fell a little	1
Fell a lot	1
Don't know	32
Total	54

Q17 Has any change in usage been more marked for some types of resource than others?

	No. of responses
Yes	18
No	4
Don't know	29
Total	51

Q18 Do you consider the RDS to be a replacement for your previous online catalogue?

	No. of responses
Yes	25
No	22
Not sure	7
Total	54

Q19 Do you continue to offer access to your previous online catalogue?

	No. of responses
Yes	40
No	14
Don’t know	0
Total	54

Q20 How close is the match between the resources your library licenses and those that the RDS includes in its unified index?

	No. of responses
100%	4
90%	17
80%	11
70%	6
60%	2
50%	2
Less	0
Don't know	11
Total	53

Q21 Do you have a federated search component in your discovery service?

	No. of responses
Yes	21
No	30
Don't know	2
Total	53

Q22 How satisfied are you with the publishers' content as offered by your RDS provider?

	No. of responses
Very satisfied	5
Quite satisfied	32
Neither satisfied nor dissatisfied	12
Dissatisfied	3
Total	52

Q23 Have you identified any gaps in the content offered by your provider?

	No. of responses
Yes	32
No	3
Don't know	16
Total	51

Q24 Do you feel that the content offered by your provider is on a neutral basis?

	No. of responses
Yes	28
No	12
Don't know	14
Total	54

Q25 Do you encourage user interaction within the RDS such as tags, reviews, rating, etc.?

	No. of responses
Yes	13
No	36
Don't know	5
Total	54

Q26 Do you offer mobile access to the RDS?

	Via an app	Via modified html
Android	5	30
Blackberry	3	28
iPhone	5	31
Tablets	5	32
None	10	15
Other	4	11
Total responses	51	51

Q28 Do you offer access to the RDS via social media?

	No. of responses
Facebook	9
Twitter	9
None	31
Other social media	8
Total	57

Q31 Please indicate your level of agreement with the following statements about users' perceptions of RDS

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The RDS makes better use of our subscription services than our previous system	24	19	9	0	0
Users find the RDS easy to use	16	24	12	0	0
The RDS works better for undergraduates / researchers	8	19	22	3	0
The RDS supports user experience in discovery	24	21	5	2	0