Chapter 14
Library Resources: Procurement, Innovation and Exploitation in a Digital World

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Introduction

In retrospect the procurement of library resources in the twentieth century was relatively straightforward. The majority of resources were only available in print format and acquired in perpetuity. Key library activities revolved around ensuring that appropriate resources were acquired in time, on budget and that a robust collection management policy was in place to ensure that shelf-space was available for new acquisitions.

Whilst similar activity related to print materials can be observed in libraries today, the complete scenario for the twenty-first century librarian is very different. Prospects for cost savings and technological advancement together signal a relentless shift towards electronic resources and away from print (Spinella 2008). The wealth of digital content increasingly being made available in a variety of forms and under a range of business models provides great opportunities for libraries to grow and develop their collections in ways previously not possible.

However, there are so many digital resources available that librarians require tools to ensure that they are able to manage the procurement process effectively whilst ensuring the end-user is able to enjoy the full potential of the digital world.

It is also important that digital resources are not considered in isolation and that the remaining print legacy that most libraries still hold is exploited in a complementary way.

This chapter highlights the ways in which librarians and the suppliers of digital content are developing systems and services to meet the expectations of the twenty-first century library user.

The digital resources

Digital content falls into two main categories:

Digitised - analogue content that has been digitised;
Born digital - originated and disseminated in digital form.
Digital content may take many forms, ranging from the well established, e.g. databases, e-journals and e-books to the more specific, e.g. theses, geospatial datasets, image libraries and digital broadcast audio/video. The wealth of digital content available can be demonstrated by the content listed below, currently available in a single full text business database – EBSCO's Business Source Complete:

- financial data

- books

- Monographs

- major reference works,

- conference proceedings

- case studies

- investment research reports

- industry reports

- market research reports

- country reports, company profiles,

- SWOT analyses

- faculty seminars (videos)

In addition to the mixed economy of procured systems, subscriptions and in perpetuity content, freely available open access resources also offer libraries an abundance of data to support the work of their scholarly community. Researchers can more efficiently locate and review content that spans centuries and that extends across disciplines (Spinella 2008).

The range of digital resources continues to grow, with local availability dictated by an institution's collection strategy. A survey by the Association of Learned and Professional Society Publishers (ALPSP) of academic journal publishers found that over 90% of journals are online compared to 75% in 2003 (Cox and Cox 2008).

At the same time, users' expectations are that library resources should be available digitally by default with the same convenience, simplicity and power demonstrated by Google.

Selection and procurement processes and onward collection management

Selection

For many university libraries, the subject specialist librarians are at the heart of the selection process. Their subject knowledge and contacts within the faculty they support are invaluable in ensuring a balanced collection strategy, whilst often operating within financially constrained budgets.

Using selection tools developed for print resources, subject specialist librarians increasingly rely on online tools provided by the suppliers and developed to facilitate selection of both print and digital resources. An example is OASIS™, supplied by Coutts Information Services, enabling selectors to order print and e-books within a single session. Other book suppliers provide similar tools e.g. Blackwell's Collection Manager, and Dawson Books' enterBooks. Subscription agents are also developing their applications in a similar way to streamline the selection and procurement processes whilst supporting collection development decisions, e.g. EBSCONET and EBSCO ERM Essentials, and Swetswise Selection Support.

New title notification and approval plans have been available for some time for print books but suppliers also now provide plans for e-books. Other supplier/vendor initiatives include: interactive digital catalogues such as the IOP Journals Catalogue to help navigate the content; pre-purchase review of e-book content ; Coutts Information Service's 'See Inside the Book'; collaborative sharing of selection activity across authorised groups of colleagues or institutions; integration within book supplier databases of out-of-print search and order such as 'iFound' from Coutts Information Services, and print on demand functionality; Joint Information Systems Committee (JISC) Academic Database Assessment Tool (2009a), an application that compares the content and functionality of bibliographic and fulltext databases; EBSCO Overlap Analysis Report, enabling librarians to compare coverage overlap in library e-collections, and Ulrich's Serials Analysis System that supports collection development activity.

Resource selection initiates the procurement process, and as such the two processes are interlinked. The ideal scenario is for the entire process to be integrated within a single workflow. This would have significant benefits for workflow efficiency and has been achieved to some extent for books and e-books by Coutts Information Service through OASIS™. A case study by Spencer (2009) describes the integration process and highlights the benefits and efficiencies achieved. Coutts will build on this further with the introduction of OASIS™ Lite in 2010 that will support resource selection by faculty.

Popular in US libraries, with some interest now being shown in the UK, are Patron Selection Plans for e-books. The library catalogue is populated with e-book records, but the library only purchases those e-books that are accessed by the library user.

Examples of other patron selection initiatives in UK institutions include:

Box of Broadcasts (BOB)[1] a service that enables users to record programmes broadcast on selected TV and radio channels. At Bournemouth University BOB replaced the Library's Off-air Recording Service, where programmes were recorded onto DVD on demand and added to library stock;
Electronic Theses Online Service (EThOS)[2], a British Library service aimed at providing digital copies of UK PhD theses on demand. This replaces the role of the traditional inter library loan service for the supply of PhD theses.
Management information generated by Inter-Library Loan (ILL) activity is often used to influence selection decisions and in some libraries the ILL activity is an integral part of the procurement process with detailed formulae in place to influence the buy or loan decision process.

Procurement

As the amount and range of digital content increases, procurement processes and collection maintenance increase in complexity. At the same time, the 'always available' nature of digital content increases the expectations of the end-user, whilst management expectations are for procurement teams to manage more resources with fewer staff.

Digital content is complex and expensive and therefore it is important that librarians and suppliers develop services and systems that procure, deliver and fully exploit the available content in the most cost-effective way.

Libraries have found that their existing Library Management Systems (LMS) are incapable of fully supporting the procurement and exploitation of available digital content and are resorting to plugging the gaps with a combination of local solutions, bought-in third party software and subscription agents' applications.

The life cycle of digital content

Whilst there are similarities between the procurement and ongoing management of traditional print and digital library resources, there are additional facets unique to the life cycle of digital content.

The procurement life cycle of digital content can be described as follows

1. Discovery and notification: similar processes to print and may utilise print notification processes.

2. Product consideration and trial processes: arrange; record details and promote the trial to faculty; gather licence and pricing information; seek and record feedback on the value of the resource.

3. Procurement: three distinct processes - licence negotiation; technical feasibility (e.g. software/hardware requirements etc); business processes (e.g. funding and purchase).

4. Implementation: register; authentication set up; configure (including link resolver, proxy server set up); catalogue and add to portals/web pages; promote.

5. Ongoing maintenance: update holdings lists; check access; troubleshoot; usage statistics.

6. Preservation and archiving: strategies and procedures for preservation of access; risk management.

7. Evaluation: user feedback; usage data; downtime analysis; renegotiate licence.

Life cycle management tools

Electronic resource management systems (ERMS) developed to manage this life cycle have been available for a number of years following the work of the Digital Library Federation's Electronic Resource Management Initiative (DLF ERMI) as reported by Jewell (2004) which specifies the requirements for an ERMS.

Papers by Collins (2005 and 2008) have provided updates on the major suppliers of ERMS and include comments from librarians on the benefits, challenges and future requirements of ERMS. Subscription agents such as EBSCO Information Services and Swets, with their knowledge of the market place and access to their customers' core data that is required to populate an ERMS, have seen an opportunity for developing a product for their library customers.

Commercial ERMS can be costly and out of reach for some libraries, who look to develop in-house solutions. Doering and Chilton (2008) describe how the University of Wisconsin-La Crosse's Murphy Library used Microsoft Access to develop an effective, but

inexpensive ERMS.

Consortia and library collaboration

Consortia negotiation for the provision of library resources is well documented (Ashmore and Grogg 2009; Carbone 2007; Pye and Ball 1999). The benefits that can be achieved in terms of cost, content and service provision are significant and can be achieved at regional, national and international levels. The recent Joint Consortium Book Agreement, a multi-consortial agreement across six UK higher education purchasing consortia that included e-book provision, demonstrates the value of collaboration.

However, there can be tensions with such agreements, at national-regional consortia levels. It is important to be able to strike an appropriate balance between the requirements of an individual institution with those of a consortium as a whole (Kinner and Crosetto 2009; Kidd 2009).

Kidd's 2009 study highlights collaboration in electronic resource provision in libraries within Scottish Higher Education, a pioneering approach for the UK - The Scottish Higher Education Digital Library (SHEDL). The pilot has demonstrated benefits for all participating institutions in terms of increased content availability, administrative and cost savings and, importantly, demonstrating a contribution to the Scottish Funding Council's shared services and collaboration agenda for Scottish universities.

Bibliographic, Citation and Full-text Databases

The range of databases available covering similar subjects and across different vendor platforms is considerable. With budget constraints common in many institutions it is increasingly important to ensure that best value is achieved in terms of content, functionality and cost.

However, evaluation is complex and time consuming. A Joint Information Systems Committee (JISC) study (Andrews et al. 2006) identified the need for an online comparison tool to help libraries make informed decisions during the selection process. As a result the JISC Academic Database Assessment Tool (ADAT[3]) was developed. In addition, database vendors are also offering similar services for example the EBSCO Overlap Analysis Report.

E-journals

Procurement of e-journals is well documented (Carr 2008) and well established, ranging from direct purchase, the use of subscription agents through to the use of regional and national consortia. NESLI2 is well established in the UK for negotiating the Big Deals with the larger publishers, and with its SMP Initiative (Small and Medium Sized Publishers) launched in 2008.

Whilst the Big Deals are a quick and easy way of securing access to a critical mass of e-journals, there continues to be concerns about the sustainability of such agreements in the current economic climate. As early as 2006 Ball (2006) identified the potential dangers of the Big Deal. Baker (2008) also recognised that the difficulties attributing cost and usage with bulk deals often lead to top slicing of budgets and a reduction in control

for librarians over collection development. A survey of librarians by Taylor-Roe (2009) highlighted that, although there was a continuing satisfaction with the Big Deals, there was also need for change.

With the development of digital newspaper services such as Press Display[4], libraries have the opportunity of providing digital access to a wide range of regional, national and international newspapers in full facsimile. In addition to benefits for the users this allows libraries to rationalise their print collections, saving space and associated staff time.

E-books

The e-book market is not yet mature, but e-books are increasingly becoming the tool of choice for researchers and students. Librarians welcome core collections by subscription but increasingly wish to buy specific titles in perpetuity to meet local requirements, particularly indicative reading lists.

The recent Joint Consortium Book Agreement 2009-13 includes an e-book element that will help member institutions purchase individual e-books in subject areas that match curriculum needs within budget requirements.

Sourcing e-books has been problematical in the past largely due to suppliers' unhelpful purchasing processes and the unavailability of desirable content, particularly textbooks. With publishers such as Springer now more confident that higher visibility of its academic e-book content has resulted in an overall increase in print sales and e-book usage, more titles are being made available (van der Velde and Ernst 2009). Recent developments by book suppliers in consolidating print and e-book data into a single database not only help with sourcing issues but also allow librarians to use existing efficient workflows to select and order print and e-books simultaneously.

Generally speaking, we see a growth in print book sales in countries where Springer has reached a high e-book penetration. Although proof is hard to find, Springer believes that the larger visibility of the academic content draws attention to its books, and results in increased print-purchases, as well as growing e-book usage.

Inter-Library Loans

The increase in digital content has contributed to the dramatic decline in Inter-Library Loans (ILL) for photocopies of articles. However, a white paper by the US Association of Research Libraries indicates an increase in book loans across its member libraries (Beaubien 2007).

Initiatives in place to improve workflow and service to remaining ILL customers include:

Secure Electronic Delivery: a service developed by The British Library for the supply of digital copies with the emphasis on speed of supply direct to the researcher's desktop (British Library 2009);
E-book loans: an initiative developed by Canada Institute for Scientific and Technical Information (CISTI) and MyiLibrary (Woods and Ireland 2008);
Use of electronic signatures for copyright (Titley 2007);
Electronic Theses Online Service a British Library service aimed at providing digital

copies of UK PhD theses on demand
ILL staff developing new skills to better serve their customers (Buchanan 2009).

Free content

The challenge to deliver freely available open access resources using resources such as the Directory of Open Access Journals (DOAJ)[5] and the Directory of Open Access Repositories (OpenDOAR)[6] in a coherent way may sometimes be as great as for procured services, since the funding can be time limited or the resource host non-commercial and therefore often cannot finance expensive new technological developments. Since 1996 the JISC funded Intute and its predecessor the Resource Delivery Network, have provided an easy route for students and researchers to access web content, identified and peer-reviewed by a network of subject specialists (Patrick 2010). Beyond August 2010, with JISC subject to its own funding reduction, financial support of Intute services in its current form will cease and librarians will need to innovate alternative information literacy tools (JISC 2009b).

Other digital content

Hypothetically, any learning material may be digitised and therefore the range of digital content a library might hold is limitless. This could include content digitised locally, from entire archives to individual book chapters or journal articles. For example, many UK universities have signed one of the two Copyright Licensing Agency's (CLA) higher education licences either the *Basic HE Licence* or the *Photocopying and Scanning HE Licence* that permit the scanning of extracts from printed publications published in the UK, US, Australia, Canada, France, Ireland, South Africa and Switzerland. The digitised content must support teaching and learning and be stored securely so that it can be accessed only by those students for whom it was specifically digitised.

Resource Exploitation

The wealth of digital content has provided new opportunities for developing innovative systems to discover and strategies to share scholarly literature (Spinella 2008).

Web Pages, Portals and Virtual Learning Environments (VLEs)

Where and how to host digital content and the tools with which to exploit that content has concerned librarians since the emergence of the web in the early 1990s. Although early library web pages tended to be fairly sterile and functional environments they provided the main access point to procured resources. Now for many academic libraries the humble web page is simply a communication tool for external visitors and a springboard to other more tailored interactive platforms such as institutional portals and VLEs for home staff and students. At Bournemouth University, for example, reading lists and scanned articles were integrated at unit level into myBU (the institutional VLE provided by Blackboard). This step supports the N Gen Learner (Beard et al. 2007), whilst a 'Library tab' delivers direct access to a federated search tool, virtual enquiry service, library catalogue, e-books, e-journals, academic skills community, subject-specific databases, blogs and communication channels.

Library Management Systems or Unified Resource Management?

Research conducted by JISC and the Society of College, National, and University Libraries (SCONUL) concluded that existing technologies used to manage library information resources are not compatible with Web 2.0 priorities (Owen 2008). Librarians have become disenchanted with a stagnant market where libraries retain an unsatisfactory LMS due mainly to the perceived cost of change. LMS suppliers have been challenged to develop a different technology model to support library development. Whilst efforts have been made by vendors to develop associated 'quick win' tools they are only available at additional cost and the base LMS remains virtually unchanged. The exception to this strategy has been OCLC, which is continuing to implement and develop a 'web-scale cooperative library management service' (OCLC 2009), that expands WorldCat Local's existing cataloging and discovery tools to include the circulation and acquisition functions that have conventionally been performed by locally installed LMS. Other commercial vendors are now trying to catch up, with ExLibris due to introduce a Unified Resource Management (URM) in mid-2011, which it hopes will provide an open extensible platform to support future and emerging library needs. Also in the UK, SCONUL have commissioned a feasibility study which will address what opportunities exist to develop a shared service response for a next generation open source LMS for UK higher education libraries (SCONUL 2009).

Library Catalogues

Traditional library catalogues are usually just one component of an integrated LMS, which is adequate to deal with print content, but is unable to effectively display digital materials. The popularity of Web 2.0 technologies and social networking has led to user perception that providing information is an interactive and collaborative activity (Lancaster 2007). Although library catalogue vendors have recognised this development they have been slow to implement similar functionality in their existing products, and would rather commit resources to other products which incur a further charge for the customer. In comparison with alternative web destinations, most library catalogues lag way behind the expectations of users in terms of search capability, usability, visual attractiveness and user engagement (Mercun and ?umer 2008).

Some libraries have incorporated Web 2.0 technologies such as social bookmarking (tag clouds), user reviews and RSS capabilities into their existing library catalogue to heighten usability, such as Napier University Library and Huddersfield University Library. It is important, however, not to overemphasise the importance of Web 2.0 enhancements to next generation library catalogues. In their study Tam et al. (2009) found that international students preferred library catalogue features that fundamentally save time, are easy to use and improve their search experience, e.g. faceted browsing, tag clouds, borrower suggestions and relevance ranking. Conversely participants were less impressed by RSS feeds, user ratings and reviews. User participation can be viewed as a social activity when contributing to external web services; however it is less certain that students would be similarly motivated to share their views on potential assignment resources in the more competitive academic environment or indeed be confident of the credibility of entries.

Search and Discovery Tools

Search and discovery tools or 'nextgen catalogues' such as SirsiDynix's Enterprise, Serials Solutions' Aquabrowser, and Innovative Interfaces' Encore provide a discovery layer or interface for traditional integrated library catalogues. Aquabrowser purports to have been the first of its kind in the library market, is interoperable with any major LMS and library catalogue systems, and allows users to 'Search Discover Refine' rather than using more traditional library search strategies. Searches are performed via a single keyword search box and in contrast to traditional library catalogues are visually represented via a colourful 'cloud' of discovery terms. Perhaps more helpfully results may also be quickly refined using a faceted search tool depending on user needs, in the same way as has been developed by commercial websites such as Amazon.

Innovative open source initiatives such as VuFind, Backlight and eXtensible benefit libraries by allowing a level of customisation not possible with most commercial products; for example relevancy ranking can be amended according to user or collection profile. However, it is important to consider that implementation involves staff and hardware costs as well as possible sustainability issues.

Since search and discover tools are, at present, merely more intuitive catalogue interfaces, institutions are either unable to or are unwilling to completely abandon their more traditional integrated library catalogues. Those who have implemented such products such as Harvard University, University of Edinburgh and University of Sussex, are perhaps offering both traditional and nextgen catalogues to satisfy the differing search needs of their patrons. However, the principal reason for persisting with the older interface, even in a minimalist way, is that the underlying traditional catalogue is still required to perform obligatory tasks such as reservations.

Federated Search Engines

The concept of searching multiple silos on the library's web site is no longer acceptable to patrons in a Google-obsessed world (James et al. 2009). Providing a single-search-box that can quickly retrieve information from all library-supplied sources is substantially more desirable to students who may be suffering the effects of procrastination, information overload and under pressure to meet assignment deadlines (Medeiros 2009). Federated search engines such as MetaLib, WebFeat and 360 Search have been widely adopted by university libraries to search multiple databases, library catalogues, e-book platforms, e-journals, newspapers etc. at the same time.

In theory one single all-encompassing search facility should also be popular amongst librarians, due to the superior accessibility and predicted time saved in information literacy training. However, federated search tools are not without their problems. Results can be disappointing as they rely on how the data are supplied by individual commercial database providers, who appear to deliberately structure their search queries differently to gain competitive advantage. Furthermore search granularity is limited, indexing is inconsistent, duplication exists, speed can be poor, relevancy is sacrificed for number of hits and results are presented in contradictory ways: for example a reference where a keyword appears on page 24 may appear to have a higher rating than a reference where the same keyword appears in the title.

The WebFeat and 360 Search products have recently been combined into a 'more powerful' 'feature pack' 360 Search service[7] but it remains to be seen whether future Web Discovery products will ultimately replace federated searching, rather than being a requirement for their implementation.

Web Discovery Tools

Are web discovery tools the answer to student procrastination in the research process? Medeiros (2009) predicts that Serials Solutions' web-scale discovery service product, Summon, is likely to be more successful as a one-stop solution in retrieving information from a multiplicity of library supplied sources than federated search tools. As with its principal competitors, Ex Libris' Primo and EBSCO's Discovery Service, Summon harvests most of the content in advance from library catalogues, repositories, contracted providers, and by leveraging federated search, rather than connecting to them in response to user queries. The resulting searchable index makes the retrieval mechanism faster and capable of normalised relevancy ranking (Hadro 2009). Web Discovery Tools are also able to exploit OpenURL and Digital Object Identifiers where a content partnership does not exist. Results are displayed in a single integrated list which can be navigated using the ubiquitous faceted browsing present in all new search tools.

Some libraries are taking a proactive approach, designing and implementing their own tools to meet users' needs for search and data discovery (James et al 2009). The HAM-TMC Library chose Vivísimo's Velocity 6.0, with a search engine, a federated search tool, and a clustering engine, to build a discovery tool.

Link Resolvers

For researchers wishing to utilise the full functionality of individual bibliographic databases an OpenURL link resolver, e.g. ExLibris' SFX, OCLC's WorldCat Link Manager, SwetsWise Linker, EBSCO LinkSource, is invaluable. Being able to link to all procured full text content from within other suppliers' databases or catalogues such as COPAC provides instant gratification, negating the need for searching separate catalogues or journal A-Z tools.

Where link resolvers fail to deliver is in the number of steps required to access content, the confusing way that data can be displayed, especially when there is a multiplicity of suppliers, and as with federated search engines their success is reliant on the connectivity and indexing of the source. Most frustrating for users is the frequent realisation of 'zero results', as the misconception of one hundred percent resource discovery seems to be heightened with this tool, whatever the magnitude of library budget.

Web 2.0 and beyond

With the wider community adoption of social media and other Web 2.0 applications, librarians must embrace new technologies that assist users and promote libraries as being at the forefront of information retrieval (Webb and Nero 2009). In researching usage of Web 2.0 applications in university library web sites Harinarayana and Raju (2010) discovered that RSS feeds and Instant Messaging (IM) were most extensively

utilised. RSS feeds are easy to implement and provide an excellent way of disseminating library product news, events and search updates to researchers, whilst IM allows librarians to provide immediate reference services. Many libraries are also utilising Facebook, the popular social networking site, to create applications and engage with students in their own environment. Whist universities are experiencing limited success with this approach, the British Library has attracted in excess of 10,000 fans.

Web 2.0 applications are so prevalent beyond the library community that they appear instinctively more attractive as enhancements for library web pages than semantic technologies (Burke 2009). Thomson Reuters have invested in semantic web technology with their Calais service – it can provide content-driven analytics, interactive data segmentation and search engine optimisation that is difficult to achieve with keyword-based searching. It is, however, hoped that Talis Platform's role in the high profile data.gov.uk project will inspire Talis to incorporate semantic web (or Web 3.0) features in its forthcoming library products.

Mobile Devices

Since mobile devices are more or less ubiquitous among library users it will become increasingly crucial to ensure that online resources such as e-book platforms, federated search tools, library catalogues and library web pages are compatible. Indeed Cummings et al. (2010) discovered that more than 58% of mobile device owning survey respondents at Washington State University specified that they would use their device to search the library catalogue.

Liston (2009) compared the performances of three nextgen catalogues (SirsiDynix's Enterprise, Innovative Interfaces' Encore and Serials Solution's Aquabrowser) using three smartphones (Blackberry, Windows Mobile and iPhone), discovering for example that only the iPhone supported Aquabrowser. Personal experience supports Liston's findings, successfully using the alternative 'high accessibility version' of the Aquabrowser interface using a Blackberry. However, although most interface functionality exists, title entries were absent. This demonstrates the need to apply pressure on vendors to provide support for a wider variety of devices. How smartphones and other Windows Mobile-compatible devices display content, enable micro-browsing and respond to accessibility guidance may ultimately decide the future success of competing library interfaces.

E-book readers such as Amazon's Kindle and Sony's Reader are the current 'must have' device of choice; to the extent that on the 25th December 2009 Amazon reached a new landmark when their e-book sales outstripped print sales for the first time and in the US Kindle was Amazon's best selling product during the Christmas period (Anon. 2009). The launch of Apple's iPad in April 2010 further propagated this market. Libraries and their vendors must therefore ensure they respond to this phenomenon. At the Texas A & M University Libraries the Kindle e-book lending program has been tremendously popular with readers, although patrons rarely selected scholarly titles, preferring to use e-books for social or general reading (Clark 2009). With a more targeted academic development the VLE suppliers Blackboard have created a 'Building Block' for e-readers that will allow users to send course documents available on Blackboard to their Kindle.

Prominent academic book suppliers Ingram Digital have also introduced MyiLibrary Audio, which allows digital audio-books to be experienced via PC, Mac, iPod, iPhone and other MP3 devices. They intend that their library procured e-books will shortly be viewable in the same way.

Student Incentives

A popular strategy amongst some UK universities has been to make equipment such as laptops, PDAs, e-readers, and content available freely to new students as a way of marketing courses and encouraging student retention. In partnership with John Smith's Campus Bookshops, Anglia Ruskin University and the University of East London offer free and discounted books by way of a bursary scheme.

Researcher Tools

Research repositories are of paramount importance in ensuring that institutional research outputs, including e-theses, are available open access. These repositories can be integrated into internal web discovery and external metasearch tools to improve content and institutional visibility. A proliferation of free and paid-for web-based tools to aid researchers in collaborative activity continue to appear, including social networking services such as Academia.edu, ResearchGATE and ResearcherID. Guidance must be given to ensure that researchers comply with copyright and are utilising the services that provide the most valuable payback. Libraries also need to make their research management and collaboration tools such as EndNote, EndNote Web, Zotero and RefWorks easily available, and ensure that all search interfaces incorporate a straightforward citation export function.

Scanning

Since nearly 100% of all new information is purported to be generated and stored digitally, scanning could be regarded as merely a transient phenomenon (Mestl et al. 2009). Until the majority of content is no longer largely textual, however, the CLA's HE licences necessarily provide UK institutions with the opportunity to scan existing print materials where digital copy is unavailable or unaffordable. Beard and Dale (2008) highlight how, under the pilot version of the licence, Bournemouth University was able to scan book chapters and journal articles and make them available at unit level via the institution's VLE. Subsequently this allowed the short loan collection that was unpopular and rarely used by students to be phased out.

It is hoped that in the near future e-book publishers will overcome their reluctance to make chapter level content purchasable and that aggregators will develop the technology to allow embedding within VLEs or other forthcoming platforms.

UK Research Reserve

The UK Research Reserve (UKRR) is a distributed national research collection of high value, but low-demand journals, managed collaboratively by the British Library and 29 UK Higher Education libraries. This innovative project has allowed libraries to de-duplicate their journal holdings, whilst ensuring continued access to titles where archive

digitisation is not commercially viable. UKRR hope that by 2013, a hundred kilometres of valuable shelf space will have been released to meet the changing needs of library researchers.

Communication Innovation

'How do you communicate information to your customers?' is a question that continually occupies librarians' thoughts. Simply adding content to a web listing, portal or VLE page is not sufficient, and patrons receive so much spam that emails are rarely read and tutorials only attended at point of need. Students in particular do not use resources unless they virtually leap from the page and shout 'Use me!'; therefore librarians have needed to embrace communication tools that meet customers in their own personal digital worlds.

Librarians are regularly blogging, 'tweeting' (micro-blogging) and creating profiles in social networking sites e.g. Facebook, to connect often quite informally with users about new acquisitions, resource developments, trials and emerging technologies. Some libraries are also beginning to use mobile technology to engage with their student population: for example Huddersfield University recently implemented delivery of a series of ten succinct 'library tips' to mobile phones of new students via SMS (text message). Typical messages contain advice and a link to a mobile device-friendly web page or online resource (Walsh 2009). Other libraries are utilising patrons' phones to facilitate audio tours and text messaging reference services (Buczynski 2008).

Informing Decisions: Making use of Quantitative and Qualitative Data

Libraries have traditionally collected data from all areas of library activity to assist with performance metrics. With the growth of digital content there is an opportunity not only to build on library performance measurement but also to quantify more accurately library operations whilst supporting collection development and funding decisions.

Most vendors and publishers routinely supply libraries with a wide range of reports on the use of subscribed content. In addition, the increasing use of industry standard COUNTER-compliant reports gives libraries the opportunity to consistently compare data across resources and vendors.

Bucknell (2008) highlighted how COUNTER-compliant usage data and MS Excel can be utilised to aid a library's decision-making processes when reviewing the renewal of large e-journal collections.

Whilst the availability of COUNTER-compliant reports has created a more reliable basis for data analysis, it is still not entirely consistent, as evidenced by Baker and Read (2008) and it is important to understand how the data are collected and reported.

In addition, data collection is time consuming and there is a danger that more time could be spent on collecting the data than is actually spent analysing the findings. The Standardised Usage Statistics Harvesting Initiative (SUSHI) (NISO 2009) aims to simplify the collection process through automation and direct data transfer to a library's ERMS.

JISC Collections (2009) are investigating the development of a usage statistics portal to

"help librarians make informed decisions about their collections through the provision of tools to aid analysis".

Combining quantitative data with the results of qualitative research can provide a powerful tool for analysing library services. Qualitative methods may incorporate feedback from individuals, focus groups and structured surveys or questionnaires such as LibQUAL+.

Fidel (2008) highlights the use of mixed methods research (MMR) as a mechanism for integrating qualitative and quantitative methods into a single study to improve its quality by the use of triangulation to verify accuracy.

Partnerships and Opportunities

Home Institution

Given frequently challenging budgetary conditions, a pragmatic view of procuring library resources is essential, as is liaising with both library and faculty colleagues within institutions. Compromise is often key to ensuring budget spend is optimised, particularly where they have been devolved to faculty and Big Deal products predominate. Librarians are also excellent collaborative partners, working together in teams to devise new ways to utilise existing systems, innovating novel functionality and evolving processes.

Young people frequently have a poor understanding of their own information needs (Rowlands et al. 2008), so it is vital that libraries carefully observe and frequently engage with their student and research communities. Product analysis, user needs surveys, targeted focus groups and feedback help to improve platforms, services and ultimately produce library advocates.

Partner Institutions

It is essential to liaise with faculty and partner institutions to ensure resources are available where licences permit, for example, where a degree validated by a university is being delivered at a college. Vigilant monitoring is required to make certain that network infrastructure, and local security settings, do not prevent users from accessing all the resources to which they are entitled. Marriott (2005) identifies students on NHS placements as being particularly vulnerable to problems with PC access, network access, software and firewalls. There is also often a training issue, where resource provision by more than one permissible provider gives access to different groups of tools and datasets, therefore causing confusion for the student.

Other Higher Education Institutions

As discussed previously, the influential role of library consortia in collectively negotiating beneficial deals is a prime example of the value of collaboration within the UK higher education community.

Another popular and valuable form of communication between higher education partners is through the use of long established discussion groups. Via JISCmail, JISC hosts a number of dynamic procurement and digital resource related discussion groups. JISC-E-

COLLECTIONS[8], for example, is a helpful open environment for information professionals to disseminate knowledge and share good practice in matters concerning negotiation, licensing, access management and agreements for digital content. The Chartered Institute of Library and Information Professionals (CILIP[9]) also provide training opportunities and forums to exchange information on digital developments. More sensitive issues such as current offers from journal publishers are communicated to the NESLi2 community via a closed discussion list (LIS-NESLI-REPS).

Discipline-linked library groups can also be powerful players in the procurement world, exerting considerable influence on traditionally non-academic suppliers. The Business Librarians Association (BLA), for example, has dealt directly with companies like Thomson Reuters, on behalf of the higher education library community, to broker favourable deals for products such as Thomson ONE Analytics. In contrast, whilst the British and Irish Association of Law Librarians (BIALL) are encouraged to provide feedback on the content and functionality of systems, commercial suppliers of legal information appear traditionally less inclined to negotiate broader deals for the academic market, preferring to contact institutions individually.

The UK Serials Group (UKSG) has a slightly different focus in that its events, training, journal and open discussion list (LIS-E-RESOURCES[10]) provide forums for all parties involved with e-resources to discuss matters relating to e-resource provision. More broadly UKSG's mission is to connect librarians, publishers, intermediaries and technology vendors and encourage the exchange of ideas on scholarly communication. This group sits at the forefront of emerging library technologies.

Working with Vendors

Increasingly both libraries and their suppliers are benefiting from working together strategically to build enhanced systems and desirable collections (*see fig 1*). This symbiotic relationship manifests itself most productively within the many company or product focussed advisory groups that have been formed by companies such as Coutts, EBSCO, Ingrams and LexisNexis®. These mutually beneficial forums allow librarians to share quality advice and feedback, face-to-face or via web conferencing software. Beta testing of new interfaces gives the vendor the opportunity to modify their platforms and introduce functionality that best serves the library community.

[Insert Figure 14.1 here - table]

Figure 14.1 Benefits of Vendor and Libraries Working Together

Challenges

Whilst the benefits of digital resources are self-evident, the challenges in ensuring their provision, discovery and use are complex. The exponential shift towards digital content requires library staff to adapt, take on new roles and acquire or develop new skills and expertise in areas such as licence negotiation, IT applications deployment, budget

management and analysis, marketing and promotion and usage analysis and reporting.

Negotiating contracts and licences for digital resources can be complex and time consuming. Organisations such as Eduserv, JISC and consortia have gone some way towards minimising the financial, consultation and legal burden by negotiating on behalf of the academic community and by introducing model licences. Eduserv estimated that their Chest agreements saved the UK academic community £28 million on the cost of software and data products in the period from January to September 2009 (Eduserv 2010).

Shared E-resources Understanding (SERU), a US initiative, is a document of understanding between libraries and publishers who have an established history of co-operating in a non-litigious manner. Published in 2008 by NISO, the document aims to minimise the effort and expense involved in licence negotiation.

Maintaining access and the preservation of digital content in perpetual usable formats are a primary concern both in terms of immediacy of access and availability of a future digital archive. As libraries subscribe to a large number of e-journals, maintaining access can be problematic. Because of staffing constraints, many libraries will adopt a fix upon failure approach to maintaining access. Collins and Murray (2009) describe a proactive strategy (SEESAU) to access verification implemented by the University of Georgia's library. Initiatives such as LOCKSS (Lots of Copies Keep Stuff Safe[11]); CLOCKSS (Controlled LOCKSS[12]) and more recently PeCAN (Pilot for Ensuring Continuity of Access via NESLi2[13]) aim to provide sustainable archives for the long-term preservation of scholarly publications.

Making users aware of the wide range of digital resources will continue to be a challenge, especially as users expect a "Google-like" experience. Lauridsen and Stone (2009) highlight the challenge and reflect on how librarians might cope.

Breeding (2009) stresses the need to maximise the impact of libraries' digital collections, especially rare, historic, or local material, to ensure relevance of libraries in the future. Libraries should aim to remain uniquely relevant by providing access to born-digital materials created by their own community e.g. research papers, conference presentations, theses, audio files, streamed lectures, blogs, wikis etc. Law (2009) highlighted this and other areas of strength and core activity that libraries should be exploiting. Breeding (2009) suggests using next-gen discovery tools and interfaces to improve the library's standing in the community it serves.

Publishers and suppliers are increasingly eager to collaborate with librarians to build and supply the content and systems that best meet library needs: however, there is a caveat; vendors' ultimate aim is to maximise profit which can conflict with library-driven innovation, the open-access movement, institutional roles and perpetually challenging budgetary environments. Some publishers, concerned about a possible decline in sales of textbooks to students, refuse to make library acquirable e-copies of their titles, whilst attempting to sell interactive course cartridges (for VLEs) directly to lecturers on the understanding that the book will be adopted as core reading. Alternatively an e-copy of a book or access to an associated teaching resource site may be purchasable by an

individual, but not a library, causing discontentment for academics, librarians and students alike. In 2009 Elsevier also caused outrage when it was reported that they had been approaching university vice-chancellors directly about taking full text open access research repositories out of universities' hands (Corbyn 2009). A repository operated by a journal publisher could set access conditions that undermine the needs of researchers and make it hard to search the data.

Periods of economic recession add significantly to the challenges already highlighted, as does the continuing tax aberration whereby e-content procured by libraries incurs VAT, although print does not. A report by JISC (2009c) documents the impacts that a recession might have on libraries, ranging from budgetary cuts through to difficulty in retaining and recruiting staff.

Conclusions

In the former print-only world, the expectations of users and librarians were lower; paradoxically now that content is proliferating rapidly, patrons expect everything to be free of charge and to be immediately and easily accessible. It should, therefore, be both the librarian's and vendor's aim to create systems that provide total integration and a seamless experience for a diversity of users.

Librarians and customers still need to engage with a multiplicity of digital and print formats. Libraries are currently spending the majority of their under-pressure budgets on e-content, but most library environments remain hybrid, due to higher costs of some digital materials, small society print titles, publisher entrenchment over textbooks, and legacy print.

Working collaboratively there are opportunities for libraries and vendors, perhaps using artificial intelligence, semantic web and cloud technology, to evolve the discovery and analysis capabilities of future search tools (Mestl 2009). The key challenge in the digital world is keeping pace with shifting internet sociologies, technologies and 'choosing the winners'.

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