

# Digital Library: transformation of academic librarian roles



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Higher education literature abounds with dark forebodings regarding the impact of the Digital Library on the traditional academic library. In a vein that will be familiar to most of us, the 'Academic Library Autopsy Report 2050' from the *Chronicle of Higher Education* argues that librarians are becoming victims of their own success, innovating themselves into irrelevance (Sullivan 2011). But as Bess Sandler of Stanford University Library comments, Mr Sullivan seems to have mistaken transformation for death (Sandler 2011). It is at this transformation that I will be looking in this paper.

The academic library today is certainly a transformed space, physically and virtually. We may sometimes miss the old smells, but nothing, not even <http://smellofbooks.com> can mask the reality that on entering a higher education library today you are more likely to enter a world of screens and cafés than one of book stacks. We have adapted our surroundings to the digital reality, but at our core we are still librarians and access to information, in whatever guise, remains at the heart of what we do. We do not mourn the loss of services no longer needed, because other services which we librarians can offer better than any other profession more than adequately take their place.

## What is the digital library?

In its narrowest sense, the digital library refers to an actual collection that has been digitised and/or that has been born digital. For the purposes of this paper, however, I intend digital library to refer to *anything* to do with the online library, whether services or resources, including catalogues, full-text resources online, and virtual learning environments.

The digital library, therefore, clearly impacts on every element of academic library work and every librarian's role. Our library spaces change. Where once large areas were given to shelving of journals and reference material, we now house new technologies and flexible workspaces for students and visiting staff. The functions of acquisition, storage, preservation and retrieval are enhanced by the use of digital technology, and our relationships with other institutions change as we join together for consortial purchasing and collaborative storage initiatives. Information literacy needs are heightened, and the librarian's expertise in copyright and licencing is reasserted in the context of virtual learning environments.

Most of the changes are new takes on old roles. Always experts in cataloguing, for example, librarians are now being called on by the research community to use their expertise in metadata and resource discovery to develop solutions for new modes of communication, including the use of research data and enhanced publications. Having negotiated with publishers on best deals for the academic community for years, librarians are now called on to play the role of honest broker in the enormously important open access movement.

A participant at a Council on Library and Information Resources (CLIR) meeting of librarians, publishers, faculty members, and information technology specialists in Washington D.C. in 2008 suggested re-envisioning the library by turning the organisation inside out:

Look at where the fringe activity is now, he said, and think about how it would look at the center of library functions. At the center could be investment in metadata—making material available to the scholarly community in a systematic way. Activities such as management of print archives and rationalizing print collections are at the periphery now. What if they were at the center? Multimedia collections are relatively weak, as is the ability to describe them. Suppose they were at the center? Scholarly communication and the creation of digital resources would be put at the center. Print and journal material, now central, would be at the edges (CLIR 2008).

Three years later, this vision of a transformed library has moved a long way towards becoming reality, a reality made possible by the digital library.

## Digital content and new modes of scholarly communication

For over twenty years the serials crisis posed a serious threat to the ability of the academic library to maintain a proper service as book budgets were slashed to accommodate rocketing journal prices. To advance his or her career, a researcher was required to publish in the most prestigious journals and then, as now, that researcher's interest in revamping the scholarly publishing system came a poor second to concerns about career advancement. Librarians, powerless to negotiate against rising prices for must-have journals, were caught in a no-win situation, a difficulty further compounded in recent years by the increased reliance on costly impact factors as measures of research worth.

The digital library, however, having played a large part in the crises above, has within it the seeds of its own rescue. For with the digital library comes the potential for free and easy dissemination of knowledge through open access. As well as which, librarians are beginning to work together on developing library metrics, including usage, circulation, and library purchase information in a way that can seriously challenge publishers domination of the 'impact' space.

## Open Access and the Institutional Repository

Librarians, nationally and internationally, have been working together collaboratively over the last ten years or so in ways that are the envy of other areas in higher education. The open access movement is a primary example of the power of collaboration. In Ireland <http://rian.ie> provides a gateway to Irish open access repositories, while internationally



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<http://www.openoar.org> gives us access to over 1800 repositories worldwide.

To date over 22 million items have been deposited in open access repositories and librarians, through active support and advocacy, have been instrumental in making that happen.

Paul Ginsparg, founder of arXiv, the ground-breaking open access repository for physics and related disciplines, speculated in 2006 that the technology of the 21st century may “allow the traditional players from a century ago, namely the professional societies and institutional libraries, to return to their dominant role in support of the research enterprise” (Ginsparg 2006). In 2011 that reality is coming closer as librarians, through their institutional repositories, become the providers of an alternative open publishing system which allows disciplines to develop in ways that the publishing system, particularly with the recent focus on measures and citations, had begun to stifle.

Researchers are allowed to get on with their research as librarians provide a mix in the repository of full text where appropriate, and of links to other trusted repositories where practical, accommodating the researcher’s natural inclination to publish to discipline specific journals and repositories. And in a very exciting way, institutional repositories are now being used in more imaginative ways to publish valuable institutional research that may not have found a home in more traditional publishing outlets.

## Data curation

A typical institutional repository today will have about forty categories of publication. This number will be added to as librarians, at the behest of researchers, begin to move into a new area – data curation.

“Researchers report that they struggle unsuccessfully with storage and management of a burgeoning volume of documents and data sets that they need and that result from their work ... While some universities have devised new services to better manage data and other information derived from research, many researchers flounder in a disorganized and rising accumulation of useful findings that may be lost or

unavailable when conducting future research” (Kroll and Forsman 2010, p.5).

Those researchers are looking to librarians to do with data what the library already do with publications – to store it, preserve it, make it findable and accessible.

The availability of vast quantities of data is transforming both the physical sciences and large parts of the humanities and social sciences. Two papers a minute are deposited in Medline while the Sloan Digital Sky Survey includes pictures of over 300 million celestial objects. Researchers are overwhelmed by this data-intensive science, dubbed the ‘fourth paradigm’ in that it moves beyond experimental, theoretical or computational science and requires new tools and techniques and ways of working (Hey et al. 2009).

Bechhofer et al (2010) argue, taking us a step further, that not only should we concern ourselves with data, but that the whole concept of what is a unit of scholarly knowledge exchange should be up for discussion. Research Objects – packaged units of active knowledge combining the source data, results data, methods, protocols, presentations, lab books, experts – should, they suggest, replace the published paper.

Whether we are considering data or the even more complex research object, it can and should be the role of the librarian to provide leadership and advice regarding appropriate standards and metadata schema for creating and capturing data, to develop policies, procedures and planning guidelines, and to advocate for and promote best practice. Librarians will need to be involved not only in the creation and capturing of data, but in data storage, description, access, identification, citation, registration, discovery, exploitation and preservation. It may be that data curators will come from within a discipline, adding metadata as close as possible to the point of creation or capture, but librarians’ advice on standards and assistance with metadata content quality will be essential.

In some research fields there are national and international repositories responsible for the curation and preservation of their scientific data. Where university libraries are likely to be especially involved is in taking responsibility for assisting with



the curation and preservation of smaller scale data sets arising from the research of individual academics or research groups.

## The semantic library

Librarians are, and always have been, involved in creating links between pieces of information. This aspect of librarians' work is entering a whole new era with the possibilities of the semantic library, as the border between container (book, journal etc.) and content becomes ever less clear.



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In most cases at present an article is made available as a pdf. A graph in that pdf can be viewed, but the data behind the graph cannot be accessed, except perhaps by contacting the researcher personally to ask to view the data. Researchers are beginning to ask for articles and associated data to be connected at the point of the graph or table so that experiments can be re-run, and indeed the data can be re-used for other purposes. Static summaries are no longer good enough. Rich information vehicles, like the research objects mentioned above, are not only needed, they are possible, and librarians can be to the fore in making them happen.

It should be said, however, that though in some areas, for example, in Computer Science, ways of publishing are changing rapidly, in general the findings of various reviews of researchers are that change will be slow both because of the conservative nature of publishing, and the conservative nature of career-focussed academics. So while librarians have certainly not fallen behind, it is through maintaining dialogues with the different disciplines that we can ensure that we stay ahead.

## Interacting with the digital library

In 2010 the Pew Internet Project in the US found that 38% of teens share content online and 21% remix content (Lenhart et

al 2010). We need to be aware of these trends, of the expectations of people that digital information can be played with in these ways that a published piece is not necessarily a finished piece, and that information today is largely designed for participation.

Where once our faculty and students had access to whatever we physically held in our library, now the expectation is that we should all have access to everything at every time. That ‘everything’ includes not only information that has been published by recognised ‘publishers’. Any of us can create our own blog, add our own opinions and comments to others’ articles and blogs, tweet our views and ideas, create links with comments on FaceBook. How much of what is written and published on the web is important? Who gets to decide? It is a complicated world, and scholars are looking to librarians to help them through it.

However, as with the publishing world, the conservative streak in academia does continue, with research showing that, though it is possible to allow students and professors to participate in the creation of our catalogues, in reality students and faculty feel vulnerable about sharing lists and recommendations, and would rather do any networking, including reviewing of books, elsewhere (Dickey and Connaway 2010). We need to be aware of the potential offered to us by digital technologies, but equally, we must constantly listen to what our users really want, to ensure that our expertise is used in ways that will benefit the user.

## Accessing the digital library using mobile technologies

Mobile technologies are one area where we could spend a lot of time for little reward. In the Universität zu Köln, for example, there were just five catalogue queries per day on the mobile device compared to 6642 queries per day on the web. So while some impressive examples of apps for libraries and for library collections have been developed – for example North Carolina State University’s <http://www.lib.ncsu.edu/m> and Duke University’s <http://m.duke.edu> – most of the interesting developments in this area are still to come.

One of the reasons that use of library mobile apps has not yet taken off is that a culture shift is needed. While we all carry mobile devices with us, few of us are able to use them to their potential, mostly because we may not know what is possible.

Adam Blackwood of JISC<sup>1</sup> argues that, with some mobile devices now having more computing power and faster connectivity than some colleges had less than a decade ago, it is a barrier to students’ learning not to embrace the potential that is there to enhance and enrich their learning experiences. As a profession, librarians have always been very aware of the need to continually upskill, and so can be expected to lead the way in developing mobile services in their universities in the very near future. Blackwood suggested that some small changes could make a

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very big difference in creating a culture shift. Students may not be aware that their phone could be used as a device to upload podcasts or read QR codes, for example, or that enabling Bluetooth could give them access to all kinds of useful library information. Or that their phone could be used as an ebook reader.

Awareness is not, of course, the only issue. Sometimes, the technology simply is not good enough for the job. For example, while students are often not aware that their phone can be used as an ebook reader, creating that awareness would be unlikely to improve the 1% share of book sales currently enjoyed by ebooks. What is likely to create major waves is the increase in the number of tablet computers recently announced at the Consumer Electronics Show at the HigherEdTECH Summit. It is very likely that in the not too distant future all students will be carrying tablets, and ebooks will quickly become the norm. Having been following the progression of ebooks for so long now, there is no doubt but that librarians will be well placed to accommodate what will be quite a seismic change.

## Conclusion

With every aspect of academic librarianship affected by the digital library, there are certainly elements barely touched on in this paper. The impact of the digital library on information literacy alone could, for example, be given several volumes. But whatever area of librarianship we look at, old or new, the important point is that as long as we play to our strengths and maintain our values, the future of academic librarianship is more than secure.

For every service no longer needed, other services for which there is more demand have taken their place. Data librarians, bibliometricians, statistics specialists, digital humanities design consultants, educational technology specialists, computational research experts, subject specialists in emerging fields like nanotechnology engineering – these are just a few of the new roles in which librarians are already working. Clearly, the digital library, far from hastening the end of the academic librarian, has enlivened the profession and opened opportunities for accessing and using information of which our predecessors could hardly have dreamed.

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