Evelyn Jamieson
INSTG027 Principles of Information and Communication Technology

"The prospect of a paperless, global information environment arriving is about as likely as that of the paperless office – thank goodness!" Do you agree?

The desire for paperless technologies can be traced back as far as the invention of the Morse Code or Edison's phonograph, both of which desired to reduce the need for paper in communication (Sellen and Harper, 2002). It seems that with each technological development, paper has been under threat; 'paper has always been a symbol of old-fashioned practices and old-fashioned technology' (Sellen and Harper, 2002, p.5). In the past this threat has been mostly symbolic, in that it was fundamentally unfeasible and never truly desired: it is worth considering that the myth of the paperless library can be traced to Geroge E. Pake, an employee of Xerox, a company whose largest profits were through paper sales (Sellen and Harper, 2002).

However, the rapid technological developments of recent years and the popular use of the World Wide Web have made the prospect of a paperless office, and more interestingly, the paperless global information environment, a reality. This essay intends to consider the feasibility and desirability of a paperless library by applying the paperless model to the principles of what traditionally constitutes a library. These principles, condensed for the context of this essay, are the collection of information, the preservation of information, and access to information through organization.

Collection of information

To simplify the whole library spectrum is difficult, but it is undeniable that the foundation lays in the collection of information for the benefit of the library's users. As Pomerantz explains; 'Unlike museums, it is seldom the materials in libraries that attract people but rather the ideas carried by the materials' (2007, p.505). Libraries, therefore, do not need to rely on a particular medium to provide this service.

The most common form of paperless libraries are those labelled by the terms 'digital', 'virtual', or 'electronic' libraries. These constitute 'a managed collection of information, with

associated services, where the information is stored in digital formats and accessible over a network' (Arms, 2000, p.2). Many libraries have embraced digital libraries to support their print collections creating a wealth of 'hybrid libraries' combining the best of both media. However, hybrid libraries have to divide their resources between both digital and print, and 'the pressure to support traditional media alongside new digital collections is a heavy burden on budgets' (Arms, 2000, p.7). The UK currently faces steep spending cuts, with reports claiming that spending on education will fall 13% in real terms between 2010-11 and 2014-15 (cited by Coughlan, 2011), with a total of £940m, a 12.6% cut, being taken from university funding over the next academic year (Vasagar, 2011). With this reduction in mind, and those across other recession-hit countries, I want to consider how effective the hybrid approach is, and whether the minimisation of print collections to create paperless libraries could allow for a more efficient library service.

Preservation of information

> The fact is that we librarians and archivists, and we alone, are responsible for something that everyone now takes for granted – that each generation will know more than the preceding generation because useful knowledge has been recorded and preserved and can be the basis for the creation of new knowledge (Gorman, 2003, p.112).

This statement by Gorman firmly places preservation of information as an important consideration if we are to propose that a library could exist in a paperless form.

Storage and space are constant issues with print libraries, and are guilty of a large financial burden with buildings accounting for about a quarter of the total cost of most libraries (Arms, 2000, p.10). Libraries often 'occupy expensive buildings on prime sites' and 'even when money is available, space for expansion is often hard to find in the centre of a busy city or on a university campus' (Arms, 2000, p.10). Space-saving remedies such as off-site storage may ease pressure on the library building, but create extra issues and costs in access and retrieval.

The paperless, or digital, library proposes to solve this problem; 'administrators have seen that the creation of a digital library or online archive enables the creation a new space even if the institution cannot buy any more physical space' (Hughes, 2004, p.20). Pomerantz asserts that hard drive of 800GB of capacity is a quantity of data equivalent to over eight thousand

metres of shelved printed materials, and it is easy now to find an portable external hard drive of 1 terabyte, measuring only 114mm in length for under £70: not only is digital storage incredibly space saving, it is also becoming increasingly inexpensive (2007, p.509). Arms proposes that 'the costs of electronic storage [are] decreasing by at least 30 percent per annumn', leading to the assumption that digital libraries will increasingly become a viable alternative to their print counterparts in terms of both saving space and money (2000, p.10).

However, the cost of Digital Libraries does not equate directly to the cost of digital storage. The cost of small, in-house digitalisation schemes are predictably expensive with even The British Library previously choosing to only offer a 'greatest hits' of its collection (Hughes, 2004, p.9). While there are now many mass digitalisation projects underway, notably Google Books and The British Library (who have been able to commence large scale projects thanks to funding) (British Library, 2008), this still raises the question of how complete a digital collection can be. If some institutions have to make decisions over what to digitalise, and even a giant organisation like Google is predicting that it would take 300 years to 'map all the world's information and make it searchable' (Schmidt cited by Mills, 2005), digital libraries will inevitably remain incomplete for the foreseeable future.

Another important consideration for physical versus digital storage is preservation. Hughes explains that 'developing a digital surrogate of a rare or fragile original object can provide access to users while preventing the original from damage by handling or display', presenting a good argument for digitalisation of rare of special collections (2004, p.11). However, these digital images require on-going preservation themselves, as hard ware technology needs upgrading or formats change. Consistency of formats over long periods needs to be encouraged, such as Adobe Systems' attempts to position itself as archival standard for text formats (Pomerantz, 2007). There is also a requirement for the institution or company itself to be sustainable and have funding for the future, and current cuts to universities in the UK are an indication of the inability to predict the longevity of some digital repositories.

One possible answer to the fears of loss of information in the switch to purely digital collections is the adoption of national or international cooperation and schemes. One example of successful cooperation lies in the UK Research Reserve (or UKRR). Journals, or serials, have caused much debate recently, as libraries move towards an increasingly digital stock to

avoid the costly storage of large back runs which often lay unused. The UKRR is a positive example of a national strategy that allows libraries to get funding for disposing of old periodicals in a controlled way that ensures three print copies are retained for national use (UKRR). This kind of systematic cooperation can ensure print copies are not completely lost, while allowing the majority of libraries to become print free in this area of their collection. This model could be rolled out for other resources to allow libraries to move from hybrid to paperless status.

Access and retrieval of information

Digital libraries allow for increased access points beyond the traditional author, title, and subject access points that remain from the days of printed and card catalogues. Not only can users now search through many electronic catalogues by keyword, digital libraries also allow for the facility to search through the entirety of the digital text, through use of technologies such as optical character recognition. These improvements mean that 'digital content can be browsed easily, and can be searched, indexed or collated instantly' (Hughes, 2004, p.4). There are also further opportunities available through high-resolution digital imaging such as the application of x-ray and ultraviolet imaging to gain increased scholarly understanding of the history of the original, such as that carried out at the British Library through its Beowulf Manuscript project (Hughes, 2004).

The access of digital libraries through the internet also allows users a freedom of access that could never be achieved through printed collections: wherever a user can find a computer and has internet access, resources are at his disposal. Digital resources are not limited by the restrictions of printed texts which must be accessed within the library's opening hours, and are often on loan, lost, or otherwise unavailable. Hughes explains that 'digital materials can be made available to a broader audience than those who have the resources or ability to travel to see the analogue collections, and access can be expanded to non-traditional audiences such as lifelong learners' (Hughes, 2004, p.9).

However, this freedom is limited to those with the means to access the internet easily. While the internet can be accessed within the library, this is still restricted by the need to travel to the library within opening hours. With standard laptops available for under £300 and netbooks under £200, it is easy to assume that most students will have a personal computer.

There has also been a recent explosion in mobile device such as iPads and e-book readers, which allow users to download texts via the internet and store them on the device to then carry with them as they would previously have done a book. However, personal computers and internet access cannot be relied upon in some areas, Sub-Saharan Africa for example, where 'telecommunications infrastructures are so poorly developed […] that participation in internet-based activities is almost impossible' (Dearnley and Feather, 2001, p.141). It is the hope that this sort of isolation will diminish as internet technology and personal computers continue to drop in price, and with the help of non-profit organisations such as One Laptop Per Child, which provides 'rugged, low-cost, low-power, connected' laptops for children from poor areas (One Laptop Per Child).

Is the time right for paperless libraries?

I began this essay by explaining that the idea of paper free communication is nothing new, and by positing paper as a symbolic link to the past which is often challenged by technology. I wish to end this essay by considering the cultural specifics that make the paperless library feasible today in contrast with the previous decade, and the attitudes which continue to hold it back.

It is clear from such publications as *Grown Up Digital* by Don Tapscott, that those concerned with the global information environment recognise a clear distinction between previous generations and those who grew up with technology and have now 'come of age'; 'they have a natural affinity for technology that seems uncanny' (Tapscott, 2009, p.9). Verheu states that 'increasingly researchers, and the general public, expect everything to be available on the web immediately' (2010, p.74). It is clear that it is less the *desirability* and more the *demand* for the paperless library that is making it a reality, and this demand is placing increasing pressure on hybrid libraries.

Despite these demands for digital resources, even digital heavy hybrid libraries are plagued by something they cannot control: the desire for print copies. Sellen explains that after the invention of the World Wide Web, 'paper consumption kept rising […] though they used digital means to find and retrieve information, they still preferred to print it out on paper when they wanted to read it' (Sellen and Harper, 2002, p.8). In 2010, the director of the

National Association of Paper Merchants, claimed that since 2000 ‘paper use […] across the UK has fallen by only 1% a year on average’, fuelled by a decrease in the cost of personal printing (cited in Hickman, 2010). It seems fit that while the library is pushing for a paperless service, the desire for print is ‘pushed down the line to the end consumer’ (cited in Hickman, 2010).

From the evidence presented in this essay, it is clear that a push towards paperless, digital libraries is in many respects highly desirable. While many hybrid libraries successfully combine the best of both print and electronic collections, these are proving to be increasingly stretching limited resources. I would argue that the best proposal for a time where many library institutions are struggling financially would be to allow for a large number of purely paperless libraries, supplemented and supported by preservation repositories such as the British Library and designated print libraries, constructed along the same systematic principles as the UKRR scheme. These print libraries would satisfy the needs of users who need access to print copies and ensure that no print information is lost, without placing financial strain on libraries that wish to focus on digital resources. This would alleviate pressure for a large number of libraries, free up space for user workstations to provide access, and free up funding for increased digital resources for remote access. It would then fall to the user to decide whether, despite the arguments, they would prefer to print the information before they read it.

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