Comparing electronic and paper short loan collections

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Comparing paper and electronic short loan collections by Elizabeth Gadd

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Abstract

Reports on a comparative cost benefit analysis of the paper short loan collection and the ACORN electronic short loan collection at Loughborough University. Describes the tasks associated with the creation and maintenance of each collection; analyses those tasks for related costs, drawing particularly on the experiences of Project ACORN; and then compares the advantages of each collection type. Concludes that although the electronic collection is currently more expensive to maintain, the benefits of electronic access to high demand material could be seen to justify those costs, and that in time-as technologies improve and associated costs decrease-it is likely that electronic collections will provide a cost· effective value-added service for libraries and their users.

Introduction

The search for electronic solutions to information access problems within higher education institutions is not a new one. Project ACORN (Access to Course Readings via Networks), an e-Lib project funded by JISC, aimed to be one such solution for Loughborough University. ACORN was charged with establishing an electronic "short loan" collection of high-demand journal articles for use by undergraduate students at the university. ACORN has now successfully completed its task and has made just fewer than 500 journal articles from over 100 publishers available over Loughborough's computer network. Five levels of security are in place to protect the copyright materials.

  Having proved the procedural and technical possibility of such a collection, the question that kept arising during our evaluation consultations with stakeholders was whether the collection was financially feasible and truly valuable to-users. In order to provide an answer to this question a simple cost-benefit comparison of both the paper and the electronic (ACORN) short loan collections at Loughborough University was under- taken. First, the creation and maintenance processes associated with each collection were analysed and then costed in terms of capital outlay') direct costs and staff costs. These analyses drew on the considerable amount of work already undertaken by Project ACORN in this area (Project ACORN, 1996a). A list of functions and features that short loan collections (SLC) provide was then created and both collection types were rated according to the quality of the function they offer.

  There are clearly a number of caveats to this piece of research. The first is that it only compares two collections at one university. Collections serving the same purpose at other sites will involve different processes and incur different costs to

those encountered at the Loughborough site (see, for comparison, Jacobs, 1996). Second, the technologies and services required to provide an electronic collection are relatively new and unsettled. Costs that are currently high may, therefore, reduce significantly over the next few years as technologies improve and additional services are introduced. Third, the ACORN service is a new, prototype service in its first year of operation. It therefore currently has no statistics on academics' "repeat" usage of the service by which to calculate yearly costs. It was estimated that usage would parallel that of the paper SLC but this may be a false assumption. (A survey is currently being undertaken to ascertain this information.) ACORN also has only a small sample of copyright charges as permission was requested for "no charge" whiles the service was in its project stage. Finally, in order to provide a thorough picture of the costs and benefits of the ACORN service it is felt that this should be compared with current paper study pack provision at the university. Study packs are an alternative method of providing high-demand materials to students and seem to involve similar processes and costs to the electronic short loan collection (ESLC).

Creation and maintenance procedures

The procedures involved in establishing and maintaining the two collections were examined under the following headings:

- Selecting materials.
- Ordering materials.
- Receipting materials.
- Processing materials.
- Managing the collection.

Selecting materials

The selection of high-demand materials for both collections is carried out by academics via reading lists. Requesting, chasing, and receiving those reading lists are therefore activities required by both collection types (see also Sherwood and Lovecy, 1997). How- ever, because electronic copyright clearance and digitisation are such time-consuming activities, more staff time is required to encourage the earlier return of ESLC reading lists. ACORN has also needed to negotiate with academics about the quantity of material they have requested for the ESLC, because digitisation costs demand that only truly high- demand items were made available this way.

Ordering materials

Ordering materials involves three main processes; preliminary tasks; requesting permissions and obtaining paper copies. Preliminary tasks include the liaison with academics concerning the accuracy of the references (an essential and time-consuming task), entering those references onto a database, checking whether the item is already held in the library. Preliminary tasks are the same for paper and

electronic collections. The need to request permission, however, differs greatly between paper and electronic SLCs.

Permission for a prescribed library to receive from another library a paper copy of a single journal article from one volume for SLC purposes is provided for by s.41 of the UK Copyright Designs and Patents Act of 1988 (CDPA88). Subsequent copies from the same volume can now be ordered through the British Library Document Supply Centre's Copyright Cleared Service (BLDSC's CCS) instead of approaching the copyright owner directly. However, neither the Act, the CCS nor the Copyright Licensing Agency (CLA) license that most libraries hold permits the creation of electronic copies for viewing by more than one person at a time. The pursuit of the journal publisher for copyright permission is therefore only necessary for those paper copies not covered by the CDPA88 or the CCS, and for all copies that are to be made available to students electronically.

The methods of obtaining paper copies vary according to the collection type. In ACORN's experience, even the most careful photocopy of a high-demand journal article may not be of good enough quality to scan if it has previously been subjected to a lot of wear and tear, or is in a thick and tightly bound volume. Originals or copies from the BLDSC are thus often needed. Copies for paper SLCs need not be in such pristine condition. Assuming the journal is held in-house, a photocopy will suffice.

Receipting materials

The act of receipting materials and permissions is not a burdensome task for either type of collection. Paying for permissions need not be either as long since the charge is an up-front license fee. ACORN's experience, however, has been that half of their charging publishers have requested usage-based royalties rather than up-front fees. Other projects have had the same experience (McRory, 1997). While ACORN can easily track such usage, this is a more difficult payment mechanism to administer as:

> (1) Libraries have no prior indication as to what usage will be and therefore their financial commitment will be;

> (2) The calculation of royalties from usage information takes time; and

> (3) Copyright owners usually require quarterly royalty payments, whereas up-front permission fees are usually paid on an annual basis.

In contrast to ACORN's experience, representatives of}ISC and the Publishers Association (PA) recently held a meeting at which publishers voted on their preferred payment type for such materials (Bide et al., 1998). Publishers were presented with a variety of possible electronic copyright permission charging methods including variations of usage-based and up-front fees. Interestingly, those present voted for up-front license fees as the best and simplest means of charging.

Processing materials

Task	Paper SLC	ESLC
Processing/ digitisation tasks	Add card cover	Cut off margins
	Add tattle tape	Scan article
	Add issue slip	De-skew the scanned image OCR image batch overnight Review file and edit
	Add barcode	Print file
		Proof read
		Make corrections
		Combine individual pages to form one PDF file
		Crop pages
		Copy PDF files to processing directory on server
Make item available	Shelve on SLC shelves	Run processing software on server inserting copyright script on each page of PDF document and produces postscript file
		Download postscript files to PC Distil postscript files to produce PDF files (Acrobat Distiller)
		Upload one copy to Printing Directory on server
		Disable PDF files on the PC
		(Acrobat Exchange)
		Upload disabled PDF files into Viewing Directory on server.

At the processing stage the tasks begin to diverge widely according to collection type (see Table 1). To process a paper copy for the SLC only four simple tasks need to be undertaken (adding covers, security strips, barcodes and issue slips). To process an electronic copy, the original needs to undergo the whole digitisation process. As has been well- documented, this is a time-consuming and consequently expensive procedure (Goodman, 1996; Sykes, 1997). Costs and timescales will, of course, vary according to whether the articles are to be scanned to image files or text files, and on the choice of file format. However, in ACORN's experience, to scan an OCR a page of a text file took up to 30 minutes, including essential proof- reading. As a consequence, only half of the ACORN articles were text-only files, the other half were image files with text underneath for searching purposes. They were all scanned into portable document format (PDF).

There are a great number of differences between the two collections in the process of making an item available as well: for the paper SLC, it is simply a matter of placing the item on the shelf, whereas preparing a digital article for electronic access involves many procedures. This is particularly the case when one is disabling the editing capacity of files and adding watermarks for security purposes as did ACORN. However, many of these tasks only demand computer processing time and not staff time.

Managing the collection

The tasks involved in managing the two collections also differ greatly. A paper collection involves the following activities (Project ACORN, 1996a).

- staffing an issue desk;
- dealing with enquiries;
- reshelving items;
- retrieving items;
- tidying the collection;
- weeding the collection;
- searching for missing items;
- replacing stolen/vandalised items.

In contrast, to maintain an electronic collection, there are only two key tasks; first, to deal with any server difficulties, and second, to check access points across campus. ACORN found that these activities took no more than 45 hours over one year, whereas to maintain a paper, SLC took 4,000 hours per annum (Project ACORN, 1996a).

<u>**Comparing costs**</u>

The differences between the two types of collection outlined above make it difficult to compare costs. An average number of items Viewing Directory on server ordered per collection per year had first to be estimated. This allowed the easy calculation of the

direct and staff costs associated with each collection. The estimates were influenced by Loughborough's SLC and ESLC collection policies outlined in Table II.

After a number of calculations had been made, based both on the above policies and also on statistics previously gathered by the ACORN, it was decided to calculate SLC and ESLC costs based on a rate of 30 new items and 170 repeat items ordered for the collections per department per year (Gadd, 1997; Project ACORN 1996a; 1996b), and an average of 25 departments within the university. Costs were divided up into capital costs, direct costs and Staff time costs. Start-up costs in terms of staff time and consultancy fees were not taken into account because they are extremely difficult to quantify and have no bearing on the day-to-day management costs

	SLC	ACORN ESLC
Collection policy	Only high-demand articles not held in-house are placed in SLC (5 per cent of total high-demand)	Only lists of less than 35 high-demand articles are placed in ESLC (whether held in-house or not)
Order of copies	All from BL (no "in-house copies put in SLC)	All from BL (quality issue)
Order of permission	Some copied under CDPA88, some publishers approached.	All publishers approached

Table II Collection policy and it effect on the order of copies and permission

Capital costs

The capital costs consisted of those hardware and software costs essential to the day-to-day running of the collections. For the paper SLC capital outlay was required for two dedicated issue terminals (£2,266), two barcode scanners (£840), two swipe keyboards (for reading borrower tickets) (£400) and one desensitiser (£1,900). There was no additional cost for the *Library Management* software (BLCMP's Talis) for two SLC terminals. For the ESLC the only hardware cost was a server at £2,500 (see also McRory, 1997) and the only software cost a copy of Microsoft Access at £45. This was because the ACORN system has been designed using mainly only freely available software tools. Access terminals were discounted because they are

necessary for both SLC and ESLC access. These calculations show, interestingly, that the ESLC incurs only half the capital costs of a paper SLC.

Direct costs

The direct costs included those for chasing permissions (fax, postage, etc.), permissions fees, clean copy costs, and processing costs. Permissions fees were taken at a rate of 5Op per paper SLC article based on Loughborough's experience where only 10 percent of SLC items tend to be charged for, and £5 per ESLC article based on an ACORN average, with an estimated 50 per cent of items being charged for. ACORN received requests for payment from nine of their 101 participating publishers: six were royalty payments and four were up-front license fees. They ranged from $1 per article printed out to $25 per page to mount an article (which the project refused). This serves to illustrate that there is currently no consensus on charging for electronic copy- right permissions among publishers. Clean copy costs were taken at £5 per item based on the cost of a BLDSC inter-library loan voucher. Digitisation costs were classed as direct because ACORN effectively contracted out its digitisation to Swets and Zeitlinger, one of its project partners, for the duration of the project. ACORN has noticed that digitisation costs have almost been halved for OCR (text) files during the 18-month project period. Initially, an average OCR file of 16 pages cost about £45, they are now costing us just £24. Table III illustrates the direct cost totals per department and for the whole university based on the above rationale.

It can be seen that the type of file chosen for the ESLC affects the cost of the collection. In fact text files are about one-third more expensive than image files. However, text files have many practical advantages including the speed of printing and display (Goodman, 1996).

Table Ill Direct costs comparison of paper and electronic SLCs

	Paper SLC	**ESLC**
Total per department per annum	£178.50	£745.50 (30 image)/ £985.50 (30 test) + 442 repeat permission = £1,187.50 (image) = £1,427.50 (text)
Total per university	£4,250	£29,687.50 (image) £35,687.50 (text)

Staff costs

Staff time costs were estimated in consultation with staff concerned in this and previous studies (Project ACORN, 1996a). These included the time involved in

selecting, ordering, receipting and processing materials, as well as that required for managing the collections. A total of 4,500 hours was allocated to the yearly maintenance of the SLC and only 3,000 hours for the ESLC. However, the difference in staff grade required to maintain each collection meant that the ESLC salary cost was currently twice as high as that for the paper SLC staff (approximately £10 per hour compared with £5 per hour). The consequence was that the SLC cost £22,500 p.a. in staff time, and the ESLC £30,000 p.a. However, as can be seen in Table IV, staff costs represent 70 per cent of the total cost of an SLC but only 32-42 per cent of an ESLC. It is expected that as the processes are simplified and standardised, the ESLC staff cost would decrease.

In summary, the total yearly costs were projected as shown in Table IV.

Table VI Estimated yearly costs to provide high-demand journal article via a paper SLC and an ESLC

	Paper	**Percentage of total cost**	**Electronic**	**Percentage of total cost**
Capital costs	£5,395	16	£2,500	3
Direct costs	£4,250	13	£29,688 (image) £35,688 (text)	41-52
Staff costs	£22,500	70	£30,000	43-48
Total	£32,145		£62,188 (image) £68,188 (text)	

   Although the figures projected by this exercise are only estimates, the results give a clear indication as to where the major cost areas lie for the two services. The main costs for the ESLC are the digitisation costs, and technical expertise. However, it is likely that in time these costs will decrease as technologies improve and become more commonplace (see Bosseau et al., 1995). The main cost area for the paper SLC is staff time in managing the collection, something that could not be reduced without affecting the level of service. In summary, the ESLC appears to be approximately twice as expensive as a paper SLC to establish and run.

Benefit comparison

Having examined the costs of both collections, the next stage was to consider the benefits of each collection. This analysis was performed by listing the main functions and features of SLCs and ESLCs as they had been identified during our research. Each collection was then rated for its contribution to those characteristics. The preferred collection for each characteristic was given a mark. The results of this exercise can be seen in Table V,

Table V Benefit analysis of paper and electronic collections

Feature	Paper	Electronic
Location	Single location (0)	Across campus (1)
Size of collection	c.325 items per dept. (1)	c.100 items per dept. (0)
Coverage of collection	Books and Journal articles (1)	Just journal articles (currently) (0)
Opening hours	Open 59.5 hours p/w (0)	Open 168 hours p/w (1)
Loan period	Up to 24 hours (0)	No loan period (1)
Concurrent users	1-3 (depending on multiple copies) (0)	As many as there are machines (1)
Fines	50p first hour, 20p subsequent hours (0)	None (1)
Item availability	Dependant on vandalism, filing, return by students, etc. (0)	Dependant on access to a networked PC (1)
Item quality	Sometimes marred by vandalism, poor quality photocopy, etc. (0)	Better quality (1)
Ease of searching	Two filing systems in place. Dependant on misfiling (0)	Always in same place, in same alphabetical order (1)
Readability (screen)	Students used to reading from paper – paper is portable (1)	Students tend not to enjoy reading from screens; however, print-outs available. (0)
Cost to copy	5-6.6p per page (0)	1-5p per page (1)
Necessity of IT skills	Little (1)	Definite need (0)
Suitability for P/T students	Not helpful (0)	More suitable (1)
Suitability for distance learners	Not helpful (0)	Potentially suitable if remote access made available. (1)
Dependant on electricity/technology	Less dependent (1)	Dependent (0)
Total marks	5	10

with marks shown in brackets. Again, this exercise only refers to the two collections available at Loughborough University. It can be seen that the ESLC received twice as many marks as the paper SLC essentially because of the increased access that the ESLC provides. There were also no fines, and no problems with theft, vandalism, or misfiling associated with the electronic collection as there were with the paper SLC. These results tally both with experiences of other institutions with electronic reserves (e.g. Shapiro, 1995) and with our findings from the ACORN Short Loan Survey, user feedback forms and focus groups. These surveys showed that both academics and students- particularly non-traditional students -tended to be

dissatisfied with the level of access the paper collection could provide (Kingston et al., 1997; Project ACORN, 1996b ;).

The characteristics in which the paper SLC surpassed the ESLC fell into two categories:

- the size and coverage of the collection; and
- the lack of dependency on technology.

In terms of coverage, the only limitation on the size and consequently coverage of the ESLC is the cost of digitisation and copyright clearance. These are both figures that may well decrease as technologies and clearance facilities improve. The dependency of the ESLC on technology is something that will not change. As such, the problems of updating the materials for viewing by new technologies, keeping down-time to a minimum and archiving, all need to be considered (Conway, 1996). However, as before, it is certain that technologies and the skills of the populations that use them are improving all the time.

Conclusions

In summary, although this comparison was something of a snapshot of one institution's experiences to date, it does serve to highlight the tasks and costs involved in maintaining each collection type, as well as illustrating the added value that an electronic collection provides.

Similarity of activities

It is clear that many activities are common to both the paper and the electronic SLCs, e.g. selecting appropriate material and ordering copies and permission. As electronic collections are a fairly new phenomenon, these processes do take longer for electronic materials. However, it may only be a matter of time before such processes are standardised or dealt with by an intermediary and thus consume less time and resources. In this case the management of the ESLC may easily be merged with the management processes of the paper SLC.

Main cost areas for both collection types the largest cost element of the paper SLC is the staff time required to manage the service. The ESLC costs lie more in the digitisation of materials and in set-up costs than in staff costs. It is therefore recommended that the costs of hardware and digitisation services are monitored carefully for improved services and prices. In particular, the advent of a national resource bank of materials as is proposed by Phase 3b of the JISC's Electronic Libraries programme should certainly reduce costs for libraries in this area.

Benefits of both collection types

It is clear that the ESLC has a number of advantages which its paper counterpart does not, significantly in terms of access. It has also been shown that those areas in which the paper SLC has preferable features to the ESLC are likely to change as people adapt to new technologies and as hardware and digitisation costs come down. ACORN has done some initial research into the use of materials included in both types of collection which intimates that users do prefer the electronic delivery of their high-demand materials (Project ACORN, 1997). However, further research into preferred methods of accessing materials, and particularly into the needs of part-time and distance learners should be undertaken. Non- traditional students clearly have the most to benefit from an electronically accessible collection. One final clear advantage of ESLCs is their ability to incorporate different types of media resource in the future. Theoretically an ESLC could take advantage of technology to either contain, or link to, a whole range of learning resources that a traditional paper collection could not.

In conclusion, the benefits of an ESLC could be seen to justify the additional costs involved in creating and maintaining such a collection. As technologies improve and costs decrease, however, it may be that libraries do not have to make so great a financial commitment in order to exploit those benefits to the full.

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