Online Versus Print Versus CD-ROM:

Costs and Benefits

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Introduction

Taking liberties with the title is a speaker's prerogative, and I do not intend to make an exception. I was originally asked to address the topic of Print versus Online in the area of secondary information - abstracts and indexes. I propose two changes.

Firstly I do not believe that it is any longer sensible to consider only this duality. CD-ROM versions of secondary tools are now beginning to flow into the market and call out for inclusion in any comparative evaluation. Secondly I retain the word 'versus' only because it is catchy and provocative. I am assuming, at least at this stage of my paper, no such value judgement or implied competitive relationship.

I shall be considering all three formats from an academic library perspective, concentrating on the balance of costs and benefits. Whilst the overall approach will be a general one I am indebted to Bruce Reid, an Aston colleague now working freelance, for carrying out comparative work on *Index Medicus* and *Medline*, and I intend to draw on his study for some concrete examples of the issues involved in making comparisons, on which decisions within each of our libraries must be made on what or what not to purchase.

Costs

The cost framework that I wish to propose recognises the different balance between start up

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and ongoing costs, and also allows for the fact that in the new format of CD, much of publisher pricing is on a trial basis, and therefore cannot be relied upon in the long term. The key areas of cost can be broken down into subscription, purchase and access costs; space and equipment; processing and maintenance; and staff and user time.

Subscription, Purchase and Access Costs

Comparative costs of different formats are made difficult at this stage because publishers are all experimenting in terms of packaging combinations across all formats, testing the market for new CD-ROM offerings, either alone or in conjunction with print, and giving special educational discounts for online access tied to print subscriptions. Many different permutations exist.

Characteristicts of print products are that they are subscription based, with a library owning the publication outright; the subscription includes known updates and cumulations and if the subscription is cancelled the library retains all backfiles. Online indexes are generally accessible on a pay-by-use basis related to connect time and printing of references. There are usually some start-up subscription charges or minimum fees but they are usually low in science and technology if not in other areas. CD-ROM products are available as both subscriptions to the database content and to the physical disc. Some subscriptions are in the nature of 'permission to use' and if the subscription is cancelled the discs have to be returned. Additional backfile costs are separate and most present prices are trial prices.

The largest difficulty in comparisons is caused by the fact that different publishers have different bundled price links between versions of their products. For example, *Science Citation Index* CD-ROM price is highly advantageous for its print subscribers. Also, there is considerable trial

packaging of subsets; for example, *CAS Selects on CD*, which provides a new and not directly comparable product.

Space and Equipment Costs

Costs in this category relate to set-up costs and ongoing requirements and range from computer equipment through to simple shelving. Printed indexes take up large amounts of floor space, many linear metres of shelving and grow incrementally. They also need fairly significant space for consultation. Even libraries like my own which relegate journal runs are perhaps less confident in relegating long runs of abstracts and indexes, which frequently provide the only direct user access to material. Yet space for collections and space for users are both at a premium in many university libraries.

The searching of online databases is usually done by information specialists in their own work area and therefore has limited space requirements, but nevertheless this area, because it is semi-public in that customers for searches are often involved in the process, requires relatively good quality space and furniture. A minimum requirement is a pc/workstation, printer and small work area with user manuals. A telephone line, modem, communications software and hard disc are also needed.

CD-ROMs require similar equipment, except for a telecommunications link, and require a disc player. Currently CDs can only be used as single access points and multiple workstations would be necessary to serve users simultaneously. The positioning of these in the library is important; certainly a public and visible area, preferably near help, is desirable. Whilst prices of players are dropping rapidly there are still major problems of hardware standards and different software for each product. Many CD-ROM products lack backfiles so it is likely that a library will need to retain older print runs and the archival quality of CD-ROM is yet to be proven despite extravagant claims of longevity.

Processing and Maintenance Costs

Each format has different requirements in terms of initial and ongoing physical processing and maintenance. Printed indexes need labelling, security tagging, shelf marking, boxing and binding. They are intellectually processed through the creation of catalogue records, check-in and chasing procedures. Their maintenance is mainly shelving and reshelving to keep them tidy enough to be useable. Online

access to databases involves no such costs but incurs significant other supplies and maintenance expenditure related to hardware and printing. Initial set up of the pc system can involve network costs such as direct line installation. CD-ROM systems incur similar costs, with even more printing and paper costs if sited in a public area for open use. It is a moot point as to whether libraries will catalogue and check-in discs.

Staff and User Costs

People-related costs are not an insubstantial part of overall costs, but are frequently not assessed and, in the case of users, certainly rarely valued in economic terms and as part of library decision making and budgeting. The learning curve for printed indexes is fairly limited. Staff time is primarily ongoing to help users find their way around the more complex tools. Online searching on the other hand requires extensive training via external courses, continuing practice and refresher training to maintain expertise. Ongoing staff costs are likely to be high, as the intermediary role is at the core of the use of online, or at the very least users are helped fairly intensively to do their own searches. Initial familiarity with CD-ROM is again much easier than online because of its product orientation to users, not librarians. Ongoing assistance to users is likely to be relatively low.

Cost Comparison of *Index Medicus* and *Medline*

The actual formats looked at as case study material were as follows: *Index Medicus* in hard copy (IM), *Medline* as mounted on Datastar (DS), and *Medline* on CD-ROM in three available versions, viz. Dialog OnDisc (DOD), Silver Platter (SP) and Cambridge Scientific (CS). IM provides monthly issues and an annual cumulation; DS is updated monthly and can be searched either in pre-elected period segments by code or by specification of year of publication of the documents; DOD is on 5 CDs, each containing one year of the file, except the current year which is updated quarterly only; SP also offers a current year updated quarterly and four year backfiles; and CS offers the current year on the same basis, but with six year backfiles, one per disc. The choice is already a complex one! Looking only at upfront costs there is little conclusive to say of the comparisons. It is interesting to note that printed backfiles are more expensive than on disc. Costing end user and intermediary time for carrying out the same trial

searches shows disc searches as far cheaper than either online or print, the latter being most expensive, although this is rather theoretical as user time is not paid for by the library!

Effectiveness of Trial Searches

A package of three small trial searches was used and each one conducted against each format. Looking at the different retrieval performance of each format for the different searches again reveals a hidden complexity in the qualitative aspects of choice. Searching **Mithramycin and Neoplasms** the large number of extra postings retrieved online were by non-print descriptors. In some of these the drug was peripheral, but in a number it featured in the title. The online search was therefore clearly superior. Both manual references were found online. Using CD the most important drawback of SP and CS was the impossibility of 'exploding' **neoplasms** using the tree structure. This meant that only references indexed at the most general term **Neoplasms** were found. Replicating that deficiency online however still retrieved two additional postings.

In the second search, allowing for the differences in IM year and publication year, there appeared to be no significant differences in retrieval between online and CD-ROM, both being superior in recall to the manual search. In the third search, the online version produced greater recall with reduced precision, but was nonetheless a better search. The CD search results were not significantly different.

Even taking the three CD-ROM versions of the same product there are major differences of approach between them. CD uses a cursor controlled, menu driven approach, which includes choices that could be classified as novice alongside those that are definitely for the experienced user. The presence of both, however, in the same menus makes choice more difficult for the novice user, whilst the form of the trained searcher options does not make it easy for an experienced Medline online searcher to work, as there are numerous small but important differences in system commands from any existing online system. SP uses an interactive question and answer mode with shorter menus aimed exclusively at the novice user. It is more user friendly, but the price is a complete opacity of what is being searched in the records as the search proceeds, making it probably most suitable for the 'few references only', undergraduate project search. DOD appears to have solved these problems more successfully, as at the

outset, the user may choose whether to use standard Dialog online commands or Easymenu search, which uses a question and answer dialogue, rather like Easynet.

I have drawn heavily on this case study material not to do a particular evaluation on your behalf, but rather to indicate to you an increasing complexity of choice on both cost and benefit grounds, making any choices favouring one format over another a difficult set of trade-offs needing to be considered in the context of one's own service environment.

Benefits

I want now to move on to a general consideration of the benefits of each different format considered under the general topics of coverage, currency, comprehensiveness, ease of use and flexibility.

— Benefits of Print

The existence in libraries of comprehensive backruns of many major abstracts and indexes is an asset not easily replaced, despite the fact that they take up incrementally more shelf space year by year and can be cumbersome and time-consuming to search. Arguably as shelf space gets more precious and more backruns become available on CD we might well see a slow phasing out of these printed volumes. Updates of printed volumes are regular but not immediate. A significant disadvantage is that traditional publications do not allow computer searching! This means usually more limited access points and lower recall than other forms. Printed volumes are, however, relatively easily used and are transportable for browsing and for simultaneous work with other material, but require laborious copying from to provide print output equivalent. Unlike CDs, simultaneous multiple use is easy, an important point for heavily accessed sources.

— Benefits of Online

Online services provide a centralized source for a broad range of information. There is access to comprehensive backfiles, with easy multi-file searching. Online files will probably always be more up to date than CD-based publications. Online facilities are the most sophisticated to support complex in-depth research queries requiring either massive retrospective recall, or immediate current awareness to very precisely tailored profiles. A disadvantage is that users generally require an intermediary to perform the search, particularly as time-related charges can significantly penalise the inexperienced user. A

variety of print or downloaded outputs are easily achieved. It is not evident that print and online are in serious competition in areas where there are higher user demands. The multiple access but limited retrieval capability of print is complemented by the in-depth and immediate currency of online.

– Benefits of CD-ROM

Backfile coverage of CD products is at yet patchy and increased file size brings the penalty of loading and reloading of discs for multi-year searching. Information updates can only be produced so far by the issuing of a new disc; this makes it a poor choice for publishing timely information. As with online, CD necessitates the purchase of new equipment and cannot at present support multi-user access. On the positive side CDs are generally oriented to end users and are proving very popular with them. Selective database downloading for subsequent processing, analysis and editing is relatively easy. In comparison with online, CD has several advantages. Databases on optical devices provide the user with privacy and freedom from pressure, except perhaps that associated with a certain slowness of response. The user does not require a librarian intermediary and is not subject to time-related, open ended database charges and telecommunication charges, both great inhibitors to novices. However, like print, CDs are never likely to be as current as online and not so likely to be comprehensive in searching outcomes. In short I do not see CDs as a serious threat to online databases. If anything, online and CD ROM are likely to complement one another.

Conclusions

What, if anything, may be concluded from this comparative evaluation of costs and benefits? Certainly the balance of advantage is likely to vary from library to library depending on their different constituencies and the emphasis given to supporting different activities, such as research or undergraduate projects. It seems highly likely that libraries will continue to spend money on a variety of materials and formats, with each coexisting with, rather than, supplanting the other. This conclusion must be worrying for both publishers and librarians alike, for it is in the context of at best static, and in real terms diminishing, library budgets for materials of all kinds. If the spectrum of offerings of a particular product is needed by and demanded from users, increasingly enthusiastic about computer based tools, then the total range of material held by a library will inevitably shrink even more. One publisher's gain will be another publisher's loss and the comprehensiveness of a library's provision will diminish.

Within this framework of coexistence however, it does seem likely that there will be a gradual migration from print to CD, especially where shelf space is at a premium. The ability to provide easily and cheaply networked access to CDs would greatly facilitate this shift. User enthusiasm for this format and independence from librarians is evident and the library looking for image enhancement can do much worse than invest in a CD or two! To publishers one can only request that they be mindful of the financial constraints of libraries in packaging their increasingly integrated product lines. 'Value added' does not necessarily have the same meaning to librarians as to publishers, and providing linkages of print to very cheap online usage, or a combination subscription to CD with limited online database access, are probably more attractive in service terms to librarians than tailored CD subsets at twice the price of more comprehensive print products!

In summary, it all depends on the circumstances. What is most apparent is that decision making is not going to get any easier and that in all cases there is a balance of benefit and disadvantage to publishers, users and librarians.