The Hybrid Library and University Strategy

http://builder.bham.ac.uk

Clare Nankivell
Centre for Information Research and Training
University of Central England

16 January 1999
Contents

Executive summary.................................................................................................................3
1. Introduction....................................................................................................................9
2. Use of printed and electronic information resources and services...............................10
3. Value of printed and electronic information resources and services...........................12
4. Concerns, barriers and questions raised for the future..................................................14
   4.1 Access to information ..............................................................................................14
   4.2 Essential differences in the types of information .......................................................15
   4.3 Publishers ................................................................................................................17
   4.4 Authority of sources ...............................................................................................17
   4.5 Interaction with information and with people .........................................................19
   4.6 Cultural barriers .....................................................................................................21
   4.7 Costs .........................................................................................................................21
5. Roles for university-wide services - Strategic Management and Information Services ... 23
   5.1 University mission and markets ..............................................................................23
   5.2 Roles of information services ..................................................................................24
   5.3 The hybrid library: an end in itself or a stepping stone to the virtual library? ...........25
6. Conclusions ..................................................................................................................26
Appendix 1...........................................................................................................................28
   BUILDER: Strategic Audit Interview questions...............................................................28
Appendix 2...........................................................................................................................29
   List of interviewees..........................................................................................................29
Executive summary

Use of electronic information: current and future

In most subject areas the ratio of printed to electronic information sources was very high - 80:20 or higher. In Business, however, the ratio was in favour of electronic sources and in Physics the balance was just in favour of printed sources.

Some electronic sources were being used by all Schools, such as electronic catalogues, abstracts and indices. All interviewees were aware that there were electronic journals in their subject areas and about half were using them. Discussion groups were known about but not widely used. Electronic teaching materials and electronic sources of information as an integral part of the teaching process were being used to some extent in Physics, Business and Medicine, but not elsewhere. Digital research data or special research collections were not known about or used in most subject areas, except Business, Education and Medicine.

Most interviewees thought that there would still be a place for both conventional and digital information sources in five year’s time. However, most interviewees expected the proportion of electronic sources used in research and teaching in their subject areas to rise over the next five years. Most thought that electronic and printed sources were likely to run in parallel for some time and that in five years, this was the likely scenario, especially for academic journals.

Primary sources of research data in the Arts and Humanities were unlikely to become digitised. Those subjects with a shorter life span were likely to move more completely to electronic information and data sources, but this would not be accomplished within five years.

Value of electronic and printed information

Printed information sources were valued highly by all interviewees, mainly because people are familiar with them, know how to access and use them and because they are still seen to have more authority than electronic information sources. Web resources in particular were valued less highly because of the lack of certainty about the authority invested in them.

Electronic resources were valued highly by all interviewees in respect of their search capabilities, particularly in the context of online catalogues, abstracts and indices.

Whilst most interviewees attached less value to electronic than to printed journals, in some subject areas this was not true. Similarly, whilst most interviewees attached little value to real or potential digitised research collections, in some subject areas they were seen as more useful than printed sources. Research students appeared to be using and valuing electronic collections and journals to a greater extent than either undergraduates or academics in many subject areas.

The value of electronic teaching materials generated a lot of concerns, mainly about cost effectiveness and the level of interaction necessary between staff and student for real learning to take place. However, in some areas, notably Medicine, electronic teaching materials were
seen as a very valuable tool to deliver teaching to a large number of students dispersed across the region.

It was generally felt that the value of electronic sources would rise slowly as the use of them rises, but that there would always be value attached to printed sources, especially as research tools in the Arts and Humanities.

**Concerns, barriers and questions**

All interviewees expressed concerns about or discussed barriers to accessing or using information resources and services. Some concerns and barriers covered printed resources and services, but the majority covered electronic resources and services. Seven key areas of concern were identified.

**Access to information**

Access to information was identified as an existing problem for some students and researchers, especially those who were studying off-campus. A second access problem was the lack of standardisation of hardware and software across the University.

All interviewees mentioned the necessity to improve access to computers for students if electronic information resources and services were to become a larger part of the student experience. Access to printers was similarly mentioned by most interviewees as an essential prerequisite of providing significant resources electronically. Compatibility of computers and printers across the institution was seen as important by some, and for others, compatibility between the computers and printers available to students and the systems of commercial information providers was seen as very important.

Access to electronic information for students off-campus was also an important concern for some Schools, such as Medicine and Education. For some Schools, access to training in the use of electronic resources and services was a major concern, both for students and for academic staff.

**Essential differences in the types of information**

Printed and electronic information resources were felt by most interviewees to have essential differences in the ways in which they could be used. This meant that different skills were required to use printed and electronic information resources and different expectations of students would arise from their use of one or the other type of resource.

In particular, interviewees expressed concerns about electronic information sources allowing no scope for browsing and the consequent loss of serendipity this entailed. Undergraduate use of electronic sources also raised concerns, especially in the ability of students to critically appraise electronic information in the same way as printed information sources. Opportunities for plagiarism were also felt to be much greater with electronic information sources, especially where academic staff did not know the sources of information used by a student in a piece of assessed work.
Other concerns about the essential differences in the ways in which printed and electronic information can be used centred on the problems of working on a computer screen. Interviewees were confident that reading on screen was an inefficient way of learning or of digesting information and that electronic sources do not encourage ‘active’ reading, by using indices or skimming texts, for example. Similarly, using electronic means to create information, especially editing, proof-reading and redrafting materials on screen, was thought to be harder than doing so in print. Students need to be encouraged to refine their own work to a high standard and electronic means do not yet encourage this.

Publishers

Publishers can be a barrier to the use of electronic information especially through restrictive copyright licences whereby access is only accorded to use on-campus. Publishers can also be a barrier in cost terms, especially for some very expensive printed academic journals. Electronic journal pricing has no pattern to it as yet and many journals are being published in parallel, with agreements such as electronic access being free if the paper version is subscribed to.

A further problem of electronic journal publishing is the question of when a publication is a publication - if authors or others can constantly alter an electronic version of a publication, there are enormous problems for those citing the work or using it in academic research. Publishers can also be a barrier to the creation of digital collections of non-journal materials such as short loan collections.

Authority of sources

Interviewees expressed concerns about the authority of electronic information sources, especially of electronic journals and Web resources. This was one of the few issues which united the interviewees in concern.

Most interviewees expressed the view that the value of journals lay in the peer review process and that any thinning of this reduced the value, integrity and quality of the information in the journal. The Research Assessment Exercise (RAE) also influenced this from the point of view of academics publishing their own work and most interviewees would not encourage staff to publish electronically at the moment because of this loss of peer review-ensured quality.

In some subject areas, such as Physics, pre-publication articles were increasingly used and valued but this gave rise to concerns about authority when there may be five or six different versions of an article in different places on the Web. The value here may lie more in the intellectual debate essential to quality research, rather than in the publication of finished articles.

Interaction with information and with people

Interaction was seen as an essential part of the academic experience by many interviewees, both with the information and with other people. Concerns about the use of electronic systems as a teaching resource partly rested on the consequent loss for students and academics of interaction between staff and students and between students and students.
There was a general feeling that electronic teaching resources could be extremely valuable, but were limited by the lack of interaction provided by real human contact - the real value of a university like Birmingham. However, they had advantages of their own in many subject areas where they could provide different kinds of interaction. A further issue was the question of who develops such tools and the likely scenario of commercial developers working with universities to develop electronic teaching tools.

Cultural barriers

Staff attitudes to electronic resources and services were a major barrier to the use of electronic information in some Schools. Raising awareness of the types of resources available within their subject areas was seen as necessary to reduce the effect of this barrier on both teaching and research. Many interviewees thought that this was a generational or cultural problem, which will gradually naturally disappear as staff retire and younger ones are appointed in their place.

Costs

Costs of electronic information were seen as a significant barrier by many interviewees. The concerns covered many areas, such as infrastructure costs, who pays, who receives the services, traditional versus electronic teaching methods.

Many interviewees thought that it was impossible to actually say what the relative costs of electronic and printed sources of information were now and would be in the future. Indeed, some stressed that this was an important area for investigation and that costing models were necessary. Some respondents did think that electronic sources of information were cheaper than printed and others thought that they would become increasingly cheaper compared to printed sources, once the necessary IT infrastructure was in place. Some respondents thought that electronic sources of information appeared to be cheaper but in fact were not since all the costs were not computed, such as the necessary hardware and software resources, printers and network costs. Network costs were of particular concern since they are currently free in HE but are unlikely to stay so for much longer and could be a huge drain on the institution’s or individual school budgets.

Teaching was mostly considered to be much cheaper to deliver through face-to-face lectures as is currently the case in most subject areas. Start up costs for electronically taught courses were considered especially high and it was felt that only by having large student numbers or courses which remained the same for some time, would such courses become cost-effective. Courses where multi-media resources were essential or useful for teaching, such as Film Studies or Medicine, were felt to be more likely to benefit from electronic teaching packages.

Roles for university-wide services

University mission and markets

Interviewees were asked to say whether they thought the introduction of electronic and networked information services and resources would alter the direction of the University as a whole, for example, by changing its market or its mission. Most felt that there were more
influential reasons behind the University’s mission and markets and that the introduction of electronic and networked information services and resources would be a small part of any changes made.

Concerns about the dilution of the research university which might follow from increased access through networked teaching and learning, for example, were aired by a few interviewees. These people felt that it was vital that the University decided on its markets and especially on what aspects of its services represented an advantage over other universities and concentrate on delivering to enhance these. If this means using electronic and networked services to a greater extent, then that should be a part of the University mission and direction, but one consequent on more important decisions.

Roles of information services

Many interviewees stressed the importance of a library and information service to the university regardless of whether electronic or printed information sources were being used. Others commented on the increased need for library staff as the transition to new sources of information takes place or the increasing emphasis on the librarian as intermediary.

Interviewees all discussed the usefulness of making a variety of current services provided by the Information Services libraries into electronically delivered services. Inter-library loans, self-ordering of materials and more electronic catalogues and indices were all felt to be useful areas which could be moved to an electronic and networked basis.

Differences of opinion emerged on the usefulness of making the short-loan collection available electronically. Some felt that it would be very useful and more efficient than the present system as it would improve access to essential but scarce resources. Others felt that it would merely move the access problem from obtaining the printed text in the library to obtaining access to a computer and printer.

Similar differences emerged on the usefulness of making journals available electronically. Some interviewees felt that it would not be useful at all, others felt that electronic mail notes informing staff of a journal’s arrival in the library would be very useful and others felt that a full electronic journal delivery to the academic’s desktop would be useful.

For teaching and learning purposes, many interviewees saw a role for Information Services in providing training for students in accessing and searching electronic resources and services and this was already happening in one or two subject areas. Information Services were also seen as having a role in actually digitising materials or mounting them on the Web, such as reading lists, handbooks and handouts. Advice and guidance, specifically with technical questions, but also in some areas with pedagogic ones, were also areas for IS staff to input to teaching and learning, especially of Computer-Assisted Learning (CAL) packages, in some subject areas.

Finally, Information Services must provide the necessary C&IT (Communication and Information Technology) infrastructure for students to access electronic and networked resources and services if they are to be used more often and more effectively.
The hybrid library: an end in itself or a stepping stone to the virtual library?

All interviewees felt that the hybrid library would be the model which was most useful and effective in providing information within a university. Printed sources of information would still be needed by many academics and students, especially in the arts subjects, but also across the subject spectrum for archive material. All interviewees recognised that variations in subject areas meant that the move to a virtual library will happen more quickly (and should do so) in some subject area resources than in others. Many interviewees pointed out that both the print-only and virtual-library models have limitations and that the hybrid library can take the best aspects of each to provide the best resources as a whole.
1. Introduction

This report presents the findings of an interview survey of senior managers in the University of Birmingham on various aspects of electronic and printed information resources and services. Questions asked covered:

- current uses of printed and electronic resources and services in teaching and learning and research
- relative value of the two types of resources and services
- perceptions of changes that will occur over the next five years
- roles that Information Services play and can play in the future.

A complete list of the questions asked can be found in Appendix 1.

Interviews were held in August and September 1998 with a mixture of Heads of Schools, senior academic managers and senior managers in Information Services. A full list of those interviewed can be found in Appendix 2. Interviews were conducted by Clare Nankivell and Pete Dalton from the University of Central England as part of the BUILDER Hybrid Libraries project evaluation strategy. All interviews were also attended by Stephen Pinfield or Andrew Hampson from the BUILDER project team.

The interviews revealed a large number of factors affecting both the use of and value of electronic information resources and services, some of which applied across subject areas and others of which were specific to certain types of subjects. All respondents commented on the differences between subject areas in relation to the relevance of electronic and hybrid library developments. It is clear that some aspects of electronic information services and facilities are more relevant to academics and students in some subject areas than in others at the moment. The report covers all of these factors and is accordingly structured as follows:

1. Uses of printed and electronic information resources and services, now and in the future, in research and in teaching and learning.
2. Value of printed and electronic information resources and services, now and in the future.
3. Concerns, barriers and questions raised for the future of electronic and printed information resources and services
4. Roles for university-wide services - strategic management and Information Services.
2. Use of printed and electronic information resources and services

Electronic information resources and services were being used by all interviewees and many of their immediate colleagues to some extent but there was great variation in the types of electronic information being used and the extent to which it was being used. All interviewees answered this question with the use of their colleagues in mind as well as their own use of printed and electronic information sources and facilities. Electronic catalogues were used by all interviewees and most were using or were aware of their colleagues using electronic abstracts and indices. In most subject areas the ratio of printed to electronic information sources was very high - 80:20 or higher.

In Business, however, the ratio for students was estimated at 60:40 in favour of electronic and for academics even higher for electronic information sources. In Physics, a figure was not quoted, but the ratio was thought probably to be still in favour of printed sources. In Education, academic sources of information were still predominantly printed, but other sources, such as government information from the DfEE or OFSTED databases, were predominantly available electronically and best used in that format.

All interviewees were aware that there were electronic journals in their subject areas; most knew of colleagues who used them and about half actually used them themselves. Pre-prints of academic papers were only really known about and used in Physics and Medicine where they were used quite extensively by researchers and some academics. Discussion groups were known about but not widely used.

Electronic teaching materials and electronic sources of information as an integral part of the teaching process were being used to a small extent in Physics, where much evaluation of their use and value had been conducted. The other subject areas where electronic teaching materials were being developed and used were Business and Medicine.

Digital research data or special research collections were not known about or used in most subject areas. In Business, however, financial data sources were a major source of research data and were accessed electronically. Similarly, in Education, electronic government data on schools, for example, was used extensively in research. In Medicine, multimedia sources, such as those showing operations or anatomical pieces of information, were being used as teaching and research tools. In the Arts and Humanities, however, there was felt to be little sense in digitising research collections, because the information was useful to only a very small number of people and because some of the value of the information lay in the actual physical artefact. There was no awareness amongst interviewees from the Arts and Humanities of projects and services relating to digitisation, such as the Arts and Humanities Data Service.

Most interviewees thought that both conventional and digital information sources were useful in different times and situations. This was unlikely to change significantly so that there would still be a place for both in five year’s time. However, most interviewees expected the proportion of electronic sources used in research and teaching in their subject areas to rise over the next five years. Some thought that this would occur as a slow evolutionary change, whereas others, especially Medicine, thought that the changes might occur quite quickly and dramatically.
Some interviewees thought that new undergraduate students would be coming to university with little experience of using printed information sources in some subject areas in a few years time. This might influence the extent to which each type of information source was used by the university population as a whole.

Most thought that electronic and printed sources were likely to run in parallel for some time and that in five years, this was the likely scenario, especially for academic journals, as illustrated by the following comments:

“Most electronic journals are imitating print.”

“At the moment there is complete confusion about electronic publishing so print will still be needed and will always be needed in a main institutional library.”

“Information that is made available electronically has to be adapted and directed towards the user in a way that takes advantage of the medium rather than just putting the written word onto the screen, I think electronic journals that intend to be only made available electronically will have to consider this issue.”

“Most of the material I have seen in electronic form is essentially an electronic copy of the paper version. I don’t know whether electronic publishing will start to develop its own unique character and develop qualities that will be beneficial in doing things that paper cannot do.”

“I believe that electronic and printed information sources should be used both side by side and if possible more integrated.”

Primary sources of research data in the arts and humanities were unlikely to become digitised and thus, there would always be a need for printed sources in some subject areas. Those subjects with a shorter life span were likely to move more completely to electronic information and data sources, but this would not be accomplished within five years.
3. Value of printed and electronic information resources and services

Printed information sources were valued highly by all interviewees, mainly because people are familiar with them, know how to access and use them and because they are still seen to have far more authority than electronic information sources in most areas. Web resources in particular were valued less highly because of the lack of certainty about the authority invested in them. Electronic resources were valued highly by all interviewees due to the search capabilities offered, particularly in the context of online catalogues, abstracts and indices.

Whilst most interviewees attached less value to electronic than to printed journals, in some subject areas this was not true. In Physics, for example, online journals and pre-prints were valued highly by researchers for the currency of information. Similarly, whilst most interviewees attached little value to real or potential digitised research collections, in some subject areas they were seen as more useful than printed sources. Research students appeared to be using and valuing electronic collections and journals to a greater extent than either undergraduates or academics in many subject areas.

The value of electronic teaching materials generated a lot of concerns, mainly about cost effectiveness and the level of interaction necessary between staff and student for real learning to take place. However, in some areas, notably Medicine, electronic teaching materials were currently being developed and seen as a very valuable tool to deliver teaching to a large number of students dispersed across hospitals in the region. Other advantages of the use of electronic teaching materials included the development of transferable skills, the interactive nature of well-designed teaching materials and the reduction in need for library space, as the following comments illustrate:

“Yes, electronic sources are valuable in my subject area. There are two reasons: one is easier access to larger numbers of people and the other is that the student comes out with increased ability to use IT which is one of the transferable skills which a decent humanities degree provides assuming that the University has sufficient resources to allow students to get sufficient know-how in the use of this kind of thing. As culture shifts there is going to be no doubt that the increasing use of IT is going to be one vital measure of the quality of the education provided."

“The advantage of electronic information sources is that you don’t have to have a great hangar of books.”

“Properly constructed electronic materials can be genuinely interactive. The presentation of materials can be related to how a student is working through the material. This interactive aspect has not been had in other media before. In the past the teacher has always had to be somewhere in the frame to manage the learning process.”

“In the school, we have been slow in the area of thinking about the use of interactive software, it may not necessarily be cheaper, but it may make teaching better. In anatomy we use videos to teach, but some medical schools are using software that is interactive, it asks users questions. I think in the more fundamental courses we could
move toward more electronic interactive forms of teaching and assessment, it is an area we need to explore.”

It was generally felt that the value of electronic sources would rise slowly as the use of them rises, but that there would always be value attached to printed sources, especially as research tools in the Arts and Humanities. Most of the following section, which examines barriers to and concerns about the different types of information, covers issues which have an impact on the value attached to such sources. Section 4, therefore, should be seen as part of the findings on the value of information.
4. Concerns, barriers and questions raised for the future

All interviewees expressed concerns about or discussed barriers to accessing or using information resources and services. Some concerns and barriers covered printed resources and services, but the majority covered electronic resources and services. Seven key areas of concern were identified and are presented here. Concerns with printed and electronic resources and services are compared where both were raised.

4.1 Access to information

Access to information was identified as an existing problem for some students and researchers, especially those who were studying off-campus, such as many in the Schools of Education and Medicine. These students were unlikely to be able to use the University Libraries simply because they were not on campus or were only on campus for short periods of time during which they were attending lectures or seminars. In Education, some of the access problems had been solved by Information Services sending books and journals to students at home.

A second access problem was the lack of standardisation of hardware and software across the University. A standard interface or some way of integrating the various systems would alleviate this problem, as would an integrated search system for electronic resources.

“...the search systems we use here are not as extensive as we would like”

“There is an issue here that the major systems that people use should be more accessible and more standard – it’s a key thing.”

Some Schools were much better provided for in terms of computers for student use than other Schools. All interviewees, however, mentioned the necessity to improve access to computers for students if electronic information resources and services were to become a larger part of the student experience. Access to printers was similarly mentioned by most interviewees as an essential prerequisite of providing significant resources electronically. Compatibility of computers and printers across the institution was seen as important by some, and for others, compatibility between the computers and printers available to students and the systems of commercial information providers was seen as very important. For example, one cannot expect Medical students to rely on electronic sources of information if the printers they have access to cannot print diagrams or pictures with any detail.

“For example, if you cannot print it is hard to read a long article on a screen especially if you are reading 50-100 pages. You need to print them off, but not everyone has the printer. If you print and you need the diagrams and they are not simple graphs, but are very information intensive there can be the problem of them being very long to download and may be poor quality due to the resolution which will continue to be a problem until the digital systems come on stream.”

Access to electronic information for students off-campus was also an important concern for some Schools, such as Medicine and Education. Currently, most information providers only provide network licences for access on-campus which means that they cannot be accessed from
home, work or other sites by students and academics. This restriction needs serious
examination and solutions found if access is to be equally available for all students.

For some Schools, access to training in the use of electronic resources and services was a
major concern, both for students and for academic staff. Interviewees felt that searching for
information electronically needed different skills to searching printed sources, and that many
people were neither skilled nor confident in this area. Searching the Internet and Web was
emphasised as an area for concern. The vast quantities of information accessible via the Web
and the lack of structure to the information meant that it was hard, if not impossible, to know
when an authoritative source of information had been found or to be sure that vital sources had
not been missed.

4.2 **Essential differences in the types of information**

Printed and electronic information resources were felt by most interviewees to have essential
differences in the ways in which they could be used. This meant that different skills were
required to use printed and electronic information resources and different expectations of
students would arise from their use of one or the other type of resource.

In particular, interviewees expressed concerns about electronic information sources allowing
no scope for browsing and the consequent loss of serendipity this entailed. There were
differences of opinion on the value of electronic search tools. Some felt that they were
superior for searching different documents whereas others thought that they were inadequate,
either because they were too general and revealed too many irrelevant sources of data or
because they were too specific and did not reveal interesting but not directly relevant sources.
One of the essential tools of a researcher across the subject areas is the ability to make new
connections and follow new leads through seeing different resources together, usually on a
shelf in a library. The ability to browse amongst materials and make such serendipitous
connections was more important in subjects where archived material was a vital research tool,
such as Arts subjects. It appears that ‘young’ subjects, such as Business, or those concerned
with information which has a short life-span can be much more easily and effectively catered
for by electronic resources, than can those with a large archive of relevant materials.
However, all respondents stated that reading documents on paper was the best way of
obtaining information and browsing within that single information sources - electronic sources
just did not allow for this type of use.

Undergraduate use of electronic sources also raised concerns, especially in the ability of
students to critically appraise electronic information in the same way as printed information
sources. It was felt that more and more undergraduates would arrive at university reliant on
electronic information sources and that they would not necessarily have the skills to compare
and appraise a variety of sources, for example in evaluating the context or authority of one
piece of information as compared with another. Opportunities for plagiarism were also felt to
be much greater with electronic information sources, especially where academic staff did not
know the sources of information used by a particular student in a piece of assessed work. This
meant that academics would need to adopt new strategies for teaching, such as specifying
particular texts which students must use or spending much more of their own time assessing a
much wider variety of sources, including the electronic ones, to enable them to ‘catch out’
those students quoting straight from sources. One interviewee encapsulated this problem:
"Some academics get quite threatened by students going out and finding information resources that they do not know about or have not used. There is an issue about raising awareness of what is available. There is pressure in terms of time, academics do not always have time to get trained and find out what is available. There are concerns with students plagiarising material."

The concern here is that academics will need to spend considerably more time than at present in reviewing the ways in which they teach to incorporate the fact that, in the future, undergraduates will use a much wider base of information than they currently use.

Other concerns about the essential differences in the ways in which printed and electronic information can be used centred on the problems of working on a computer screen. Interviewees all printed larger items off to read, for example, and were confident that reading on screen was an inefficient way of learning or of digesting information. For example, one cannot write on a text on screen as one can make notes on a printed text, nor can one easily take an electronic source of information on an aeroplane or into the bath to read, for example, which may be where one learns best. Electronic sources do not encourage ‘active’ reading, by using indices or skimming texts, for example.

"Although electronic sources are potentially searchable, anyone who is an active reader does not just start at page one and work toward the end, they use techniques of skimming and using indices and these are skills which are still important for students to learn, they need to read actively rather than passively. There are similarities, more than hypertalk would suggest between using a text and using electronic means. IT can actually make you jump around superficially, like flipping channels on a television and make them not actually engage with the same kind of depth as printed..... The intellectual competencies need to be there and the talk about information and access to information as if all it means is being able to obtain facts and learn them is a really superficial way of looking at what the education is all about. We still need to get people to learn to think, to make judgements about what is good information and what is not."

"Also the image on the screen is vertical, you never really read things like this and you cannot write on a computer screen. The light from an image on the computer screen is emitted whereas it is reflected on paper. There are still limitations. The ability to be able to write on things is important, what I do with a journal article is highlight key bits which not only tells you what is important, but strengthens that texts encoding. It may be a generational thing. I can read things through on the screen, but it reinforces it if I can make corrections and highlight things on a printed copy. Other people may be able to operate in other ways. You may be able to come up with an interactive equivalent of that highlighting."

Similarly, using electronic means to create information sources can be much harder than using printed sources. Editing, proof-reading and redrafting materials on screen are all much harder than doing so in print. Students need to be encouraged to refine their own work to a high standard and electronic means do not yet encourage this.
4.3 Publishers

Publishers can be a barrier to the use of electronic information especially through restrictive copyright licences as discussed in 4.1, whereby access is only accorded to use on-campus. Publishers can also be a barrier in cost terms, especially for some very expensive printed academic journals. Electronic journal pricing has no pattern to it as yet and many journals are being published in parallel, with agreements such as electronic access being free if the paper version is subscribed to. It is unclear how journal pricing will develop over the next few years and some interviewees were concerned that unfavourable or unworkable cost and access structures would be imposed upon them by publishers. Access to electronic archives of journals, for example, may be impossible if one cancels one’s subscription to current issues whereas for printed journals, one still has the complete archive in the library. The questions of how to archive and preserve electronic information sources needs to be addressed by publishers and institutions to ensure long-term use of such sources.

“I’d like to think that the publishers could be overcome or bypassed, so there is not a situation where universities produce material which publishers sell back to universities.”

“Going into publishing a journal electronically has a huge economic impact on learned societies in those subject areas and they do not know how to deal with this situation.” [commenting that many academic journals are published by learned societies which make their income from publication and which would have to look elsewhere for income if they lost this key source.]

A further problem of electronic journal publishing is the question of when a publication is a publication - if authors or others can constantly alter an electronic version of a publication, there are enormous problems for those citing the work or using it in academic research.

“A difficulty that may lie at the back of peoples minds is that it is so easy to change electronic versions and there needs to be an authoritative reference version held somewhere…There is the issue of deciding when does a publication becomes a publication?”

Publishers can also be a barrier to the creation of electronic collections of non-journal materials such as short loan collections. University libraries all have a short loan collection of key texts, including textbooks and journal articles. To improve access via digitising these materials is currently very difficult as copyright permission must be secured for a new format.

4.4 Authority of sources

Interviewees expressed concerns about the authority of electronic information sources, especially of electronic journals and Web resources. This was one of the few issues which united the interviewees in concern. CD-ROMs were generally felt to have similar authority to printed sources, since they had usually been through a similar process of peer review and publishers’ checking to ensure authority prior to publication. However, concern about their long-term value was expressed:
“I think CD-ROMs are getting left behind...I think the Web and Internet will roll CD-ROMs over, except when people wish to provide long term bibliographies and perhaps theses will be made available on CD-ROM. The Web will take over.”

One of the problems of printed journals is the currency of information, where the process of peer review can take a few months and then publication follows some months later. In some subjects, such as Physics or Medicine, this makes much of the published information out of date or even irrelevant. In other subjects, currency of information is less of a concern. Electronic journals have the scope to reduce considerably the time from submission of a paper to publication of it, even with a proper peer review process, as the journal can be published immediately that the editor receives reviews and decides to publish the item.

“It is good to provide the information remotely in a more flexible way than the textbook which is always out of date by the time it is printed.”

“There is no doubt that they like the speed of access that comes with electronic publishing, they can get an electronic pre-copy of a publication from the States, for example, the day after it has been approved by the editors, instead of waiting 6-9 months for the paper copy.”

Most interviewees expressed the view that the value of journals lay in the peer review process and that any thinning of this reduced the value, integrity and quality of the information in the journal. The Research Assessment Exercise (RAE) also influenced this from the point of view of academics publishing their own work and most interviewees would not encourage staff to publish electronically at the moment because of this loss of peer review-ensured quality. As one respondent said:

“Even if something electronic is refereed, it may be valued less”.

Other comments on this included discussion of the stability of electronic sources, as already mentioned - when is a publication a publication? The advantages of electronic versions which can be altered lie in the ability to perfect a piece of work or feed in other’s results to your own publication. The disadvantages lie in the fact that there is no definitive version of an article.

“An electronic journal still should have a proper limitation and regulation of peer review built into it.”

“There are worries also concerning refereeing and whether people can log in and change their papers after they have been published.”

“The flood of electronic publishing will be stemmed by rigorous refereeing. It comes down to a quality issue.”

“With proper control of the electronic resources there is no reason why they should not be as authoritative as the printed sources except no one has worked out what the ground rules for this will be yet. It is not a fundamental limitation of electronic information.”
“The printed version has always had a lot of authority and is relatively formal, the electronic medium has a very informal less authoritative cultural history. It can be overcome.”

“The two big things that determines how things go is the person interface and how you get to know what is authoritative. The whole approach to electronic materials has been spoilt by the freedom of access to poor quality information on the Internet.”

“Peer review can be done in electronic journals.”

In some subject areas, such as Physics, pre-publication articles were increasingly used and valued but this gave rise to concerns about authority when there may be five or six different versions of an article in different places on the Web. The value here may lie more in the intellectual debate essential to quality research, rather than in the publication of finished articles. One interviewee expressed this very clearly:

“There is a tension between the commercial and the academic. A different tension arises between the purely intellectual pursuit of ideas and discussion and the need for concrete refereed, published, solid research which will count for the research assessment exercise and those cultures will be in conflict, which will be a barrier to publishing electronically”.

Authority of electronic sources on the Web and student use of such sources, are of great concern to many academics. These concerns have been discussed above in section 4.2.

4.5 Interaction with information and with people

Interaction was seen as an essential part of the academic experience by many interviewees, both with the information and with other people. Concerns about the use of electronic systems as a teaching resource partly rested on the consequent loss for students and academics of interaction between staff and students and between students and students. One interviewee felt that

“A charismatic teacher is irreplaceable and some staff would not want to give up their ‘presence’ with the students”.

There was a general feeling that electronic teaching resources could be extremely valuable, but were limited by the lack of interaction provided by real human contact - the real value of a university like Birmingham. However, they had advantages of their own in many subject areas where they could provide different kinds of interaction. Any CAL developments should, in the first instance, be developed as support tools, not as sole teaching resources and could focus on students studying at a distance, including Medical students studying at various hospitals around the region. A further issue was the question of who develops such tools and the likely scenario of commercial developers working with universities to develop electronic teaching tools.

“I suspect that the area we need to think about is just now starting to occur. It is the involvement of large commercial organisations in the management of teaching and learning information and material.”
“I think in the more fundamental courses we could move toward more electronic interactive forms of teaching and assessment, it is an area we need to explore.”

“Distance learning and the extent to which people go in that direction will dominate the amount of teaching packages available electronically.”

“If you are trying to memorise something it is vital to have a system that places what you wish to remember in a framework of association and new ways of delivering information can allow us to do this better – multi-sensory learning cannot be done with a textbook. It is not therefore substitution in teaching, but is actually adding something which is a new dimension in teaching. That is why I want my students to get access to broad band networks in hospitals. This will enable them to revise at night, examine themselves, listen to noises and look at pictures and answer associated multiple choice questions to tell them what it is as in real life you have multi-sensory experiences, there is no better way to do it.”

“Transferring information from the lecturer’s notes to the students notes without it passing it through the heads of either is not good teaching. If one can change the culture of students from wanting to be spoon fed to where they are taking much more responsibility for their own learning, if they are given through IT guided ways of getting the basic information they need and finding out what the topic is about, then the tutors input is much more like the old small group tutorial in which there is a real intellectual exchange. If this happens then you have really enhanced the quality of university education. It is a case of where is the tutors time best placed. It is characterising a hybrid approach to teaching and learning.”

“That process of learning how to be critical and selective and to make something out of information, which is something we have tried to do in arts-based courses is still a major issue whatever the source of information and we must be careful to not view electronic sources as a substitute for that kind of critical interaction. This is why people doing all their education at a distance using IT may miss some of the important quality elements. That is not to say that you cannot set up good CAL packages which can interact etc., but there is a sense in which when you meet with a creative mind face to face and it may be extended through Email communication etc., there is a real level of a tutorial which it is very hard to substitute. A university needs to be clear that it is a very important extra resource, but it is not going to remove a great deal of the other activity which is actually valued by staff and students.”

Electronic discussion groups were used by some interviewees and there were different views as to their value as tools for interaction. These concerns covered two areas:

1. the problems of intellectual copyright and consequent fears of having good research ideas stolen
2. multiple levels of users, from naive undergraduates with basic questions to post-doctorate students with sophisticated knowledge and queries.

Responses to electronic journals were also cited as a concern. With printed journals, there is usually an established route whereby one can respond to articles, usually through the letters
pages. For many electronic journals, however, no such systems yet exist and this is a major barrier to the learning experience.

4.6 Cultural barriers

Staff attitudes to electronic resources and services were a major barrier to the use of electronic information in some Schools. Raising awareness of the types of resources available within their subject areas was seen as necessary to reduce the effect of this barrier on both teaching and research. Many interviewees thought that this was a generational or cultural problem, which will gradually naturally disappear as staff retire and younger ones are appointed in their place. Indeed, some of the interviewees referred the interview team to other staff for more detailed or knowledgeable information, since as they themselves were more senior and therefore older staff, they were not culturally as aware or knowledgeable about electronic information or its implications for management and change.

“We are in a point of dramatic transition. One problem is that those who are in the main leadership management positions have grown up in one kind of culture and younger staff are beginning to be part of a different kind of culture and the transition is difficult to manage for this reason.”

4.7 Costs

Costs of electronic information were seen as a significant barrier by many interviewees. The concerns covered many areas, such as infrastructure costs, who pays, who receives the services, traditional versus electronic teaching methods.

“At this point electronic information sources are much more costly than printed. They often duplicate what is already produced in print form. You have to consider the infrastructure and support costs and at this stage we are in the process of building that infrastructure and support.”

Many interviewees thought that it was impossible to actually say what the relative costs of electronic and printed sources of information were now and would be in the future. Indeed, some stressed that this was an important area for investigation and that costing models were necessary.

“In Physics the cost issue of electronic publications has just not been addressed, despite public meetings about it, nobody is making the first move. We subscribe to the three best journals as a school as they are in such demand so people use our copies and the library copies. This cost us about £2000 a year. We don’t know what the pricing policy will be when these are properly electronically published and the network costs as soon we will have to pay network charges to access things abroad. You would imagine that electronic publishing should be cheaper to access, but we don’t know what the ground rules are yet. It is impossible to answer it.”
Some respondents did think that electronic sources of information were cheaper than printed and others thought that they would become increasingly cheaper compared to printed sources, once the necessary IT infrastructure was in place.

“In the context of what is likely to happen, it is unlikely that printed journals should become cheaper and it is likely that electronic delivery of information which is already cheap in terms of the recurrent costs will become cheaper.”

Some respondents thought that electronic sources of information appeared to be cheaper but in fact were not since all the costs were not computed, such as the necessary hardware and software resources, printers and network costs. Network costs were of particular concern since they are currently free in HE but are unlikely to stay so for much longer and could be a huge drain on the institution’s or individual school budgets.

Differences of opinion emerged on the issue of whether printed or electronic sources required more physical space - a major cost issue. One respondent stated that electronic sources require more space as rooms of PCs are necessary to support this. Another respondent said that electronic sources of information were cheaper, partly because libraries would no longer need to be “hangars of books”.

Some respondents felt that the onus of the costs would move to different people. For example, the costs to students would rise if they have to print off electronic texts instead of borrowing printed items from the library but the library would save money by reducing its costs in storage of items and in sophisticated systems necessary to enable retrieval of those items. In order to have full access to the resources they need, students might also need to purchase computers, printers and network contracts too. It was felt unfeasible for the University to provide individual access to electronic sources of information to 19,000 students.

Journal subscriptions are currently fairly expensive to the institution and this might fall if electronic journals take over. However, many academic journals are published by professional or learned bodies, who cover their expenses through journal subscription rates. In order to carry out the rest of their functions, these bodies may need to raise their membership rates considerably, so the cost will be passed to members, often academics themselves.

Teaching was mostly considered to be much cheaper to deliver through face-to-face lectures as is currently the case in most subject areas. Start up costs for electronically taught courses were considered especially high and it was felt that only by having large student numbers or courses which remained the same for some time, would such courses become cost-effective. Courses where multi-media resources were essential or useful for teaching, such as Film Studies or Medicine, were felt to be more likely to benefit from electronic teaching packages. For example, in the medical school, packages showing real examples of rare diseases or problems students would be unlikely to see over the course of their training, with video, pictures or sound, can be much more effective than a printed written account. Similarly, additional course resources, for those who need extra support could be usefully supplied electronically, since the need for one-to-one extensive tutorial would be lessened by so doing.
5. Roles for university-wide services - Strategic Management and Information Services

5.1 University mission and markets

Interviewees were asked to say whether they thought the introduction of electronic and networked information services and resources would alter the direction of the University as a whole, for example, by changing its market or its mission. Most felt that there were more influential reasons behind the University’s mission and markets and that the introduction of electronic and networked information services and resources would be a small part of any changes made. National changes in the funding of HE, for example, were thought to be the key factors which would influence the direction of the University over the next few years. Other external factors, such as the collapse of the Asian economies might also influence the University’s direction more than new information sources would. However, such changes might mean that the University examines the opportunities provided by electronic and networked systems and services more closely as a way of delivering its undergraduate teaching, in particular. Furthermore, the University may need to examine the potential of collaboration with commercial companies in supplying electronic teaching resources, as mentioned in Section 4.5.

Concerns about the dilution of the research university which might follow from increased access through networked teaching and learning, for example, were aired by a few interviewees. These people felt that it was vital that the University decided on its markets and especially on what aspects of its services represented an advantage over other universities and concentrate on delivering to enhance these. If this means using electronic and networked services to a greater extent, then that should be a part of the University mission and direction, but one consequent on more important decisions.

“We also have to take very seriously at Birmingham University that we are research led and that it is important to get undergraduates to know that they are part of a research community and that they are not just learning a body of knowledge that already exists. IT can enhance that, there is huge amount of enhancing that can be done through this medium, but there is also a danger of using it as a substitute and undermining the quality of what we do if we are not careful. The view of the BUILDER project, that it contributes to creating seamless information resources should be encouraged as it is a good thing, rather than the situation where we are delivering the education at arms length through IT. That is how I would see the BUILDER project as being a positive contribution, to work out a quality use of IT in what is essentially a campus based university.”

“The academic community (a “community of scholars”) should not be defused too much - Birmingham University shouldn’t be diluted although the IT would allow it to be now. There could, however, be a new market for post-experience courses at a distance - professional or personal interest, perhaps with local groups getting together to access Birmingham University courses but still as a ‘learning community’.”

“The mission will change as the University becomes a less bounded exclusive area for participating in research. Once we get more dialogue about what is going on in the field it changes quite dramatically, it no longer has a physical monopoly over where
you can find new knowledge. Exclusivity is undermined by electronic developments and universities have to respond to this and decide what it is that represents their relative advantage.”

### 5.2 Roles of information services

Many interviewees stressed the importance of library and information services to the University regardless of whether electronic or printed information sources were being used. Others commented on the increased need for library staff as the transition to new sources of information takes place or the increasing emphasis on the librarian as intermediary.

> “Libraries whether electronic or hard copy are a crucial thing. I see libraries' role as making electronic that which was done on paper before.”

> “There is a need to learn many types of interfaces which is a clear disincentive to using electronic sources, if you had a departmental source which meets the way in which the department is doing its work it is useful. A local intermediary is useful as is a generic standard.”

Interviewees all discussed the usefulness of making a variety of current services provided by the Information Services libraries into electronically delivered services. Inter-library loans, self-ordering of materials and more electronic catalogues and indices were all felt to be useful areas which could be moved to an electronic and networked basis. In some subject areas, such as Education and the Arts and Humanities, however, caution was expressed about doing this too quickly as students often did not have access to the necessary technology to be able, for example, to use a networked inter-library loan service.

Differences of opinion emerged on the usefulness of making the short-loan collection available electronically. Some felt that it would be very useful and more efficient than the present system as it would improve access to essential but scarce resources.

> “It [electronic short loan collection] could make key papers available electronically. There are 120 students chasing items from a reading list, it would be helpful.”

Others felt that it would merely move the access problem from obtaining the printed text in the library to obtaining access to a computer and printer. Clearly, access to computers varies enormously from School to School and this needs to be borne in mind when changing any printed delivery system for students to an electronic format. Concerns about the ability of students to absorb large texts on screen were also raised. It was felt possible that a useful electronic short loan collection might need to be used in a very prescriptive way by lecturers since students would not be able to use whole texts anymore. Copyright issues were also raised, as discussed in 4.1, for access to such resources, especially off-campus. However, it is clear that some interviewees thought that a large proportion of teaching materials (probably only in some areas) would be electronic in five years time, so these issues do need to be resolved.

Similar differences emerged on the usefulness of making journals available electronically. Some interviewees felt that it would not be useful at all, others felt that electronic mail notes
informing staff of a journal’s arrival in the library would be very useful and others felt that a full electronic journal delivery to the academic’s desktop would be useful.

For teaching and learning purposes, many interviewees saw a role for Information Services in providing training for students in accessing and searching electronic resources and services and this was already happening in one or two subject areas. Information Services were also seen as having a role in actually digitising materials or mounting them on the Web, such as reading lists, handbooks and handouts. Advice and guidance, specifically with technical questions, but also in some areas with pedagogic ones, were also areas for IS staff to input to teaching and learning, especially of Computer-Assisted Learning (CAL) packages, in some subject areas.

“We need to rethink what a library should be doing and whether we need to have vast temples. You might argue that we need much more specialised support for electronic accessing and a lot more teaching as it is a sophisticated business to get the most out of electronic searching.”

“It comes back to a wider issue of how libraries will certify the quality of electronic material.”

Finally, ) in some subject area resources than in others. Many interviewees pointed out that both the print-only and virtual-library models if they are to be used more often and more effectively.

5.3 The hybrid library: an end in itself or a stepping stone to the virtual library?

All interviewees felt that the hybrid library would be the model which was most useful and effective in providing information within a university. Printed sources of information would still be needed by many academics and students, especially in the arts subjects, but also across the subject spectrum for archive material. All interviewees recognised that variations in subject areas meant that the move to a virtual library will happen more quickly (and should do so) in some subject area resources than in others. Many interviewees pointed out that both the print-only and virtual-library models have limitations and that the hybrid library can take the best aspects of each to provide the best resources as a whole.

“I think we are likely to require specialised electronic librarians that can have global access to libraries electronically and databases and who can control an extremely complex Web of options. This will be the future developments as the hybrid library moves further toward the virtual library.”
6. Conclusions

One of the key findings of this report is that the use and value of digital and electronic library and information resources vary significantly across the Schools within the University of Birmingham. These subject specific differences must be considered in any discussion of developments for the hybrid library.

**Use of electronic information sources.** Electronic resources are being used across the Schools at present but for a significant proportion of academics, especially in the Arts and Humanities, much of this use is limited to electronic searching tools, such as catalogues, abstracts and indices. On the other hand, sophisticated use of digital research data sets and multi-media teaching resources is evident in some Schools.

**Value of electronic information sources.** Printed information sources were valued highly by all academics interviewed. The value of electronic information sources varied enormously, both across Schools and across different types of electronic materials. Seven key concerns emerged from the discussions about the value of electronic information sources:

1. **Access to information.** Problems discussed included access to electronic information for students and staff off-campus, lack of standardised hardware and software across the institution, the number of computers available for students on-campus and the number and compatability of printers available for student use.

2. **Essential differences in the types of information.** Printed and electronic information sources are used in different ways. Concerns about electronic sources included an increased opportunity for students to successfully plagiarise, lessened opportunities for browsing within texts, the ability to read critically from and edit materials effectively on a computer screen.

3. **Publishers.** Publishers were perceived as barriers to electronic information use, especially in respect of copyright licences.

4. **Authority of sources.** Information sources for use in academic study and research must carry authority if they are to be of value. This issue united all the interviewees in the view that the peer-review process for journals is the way in which they acquire that authority and that until electronic journals have a similar and equally dependable system, their value will be lower than that of printed journals.

5. **Interaction.** The use of electronic systems as a teaching resource concerned many interviewees as it entailed the loss of human interaction which they felt to be an essential part of the teaching and learning experience at the University of Birmingham.

6. **Cultural barriers.** Many interviewees discussed staff attitudes to electronic information resources as a concern, but commented that this may well be a cultural or even just a generational problem which will eventually disappear.

7. **Costs.** The costs of resourcing adequately an electronic library and information resource was seen as a significant problem by many interviewees.

**Roles for Information Services.** Interviewees mentioned a variety of ways in which Information Services could work to improve access to and use of information across the University. Some specific services were identified as useful to digitise, such as the inter-library loan system, more catalogues and indices, a process of self-ordering of materials and the short loan collection.
Beyond these, interviewees thought that Information Services would or should move in the direction of:

- providing more training to staff and students
- digitising materials and mounting them on the Web
- advising and guiding academic staff in developing electronic teaching materials
- co-ordinating the provision of an effective and flexible C&IT infrastructure for the University.

Finally, interviewees all felt that the hybrid library would be the model which was most useful and effective in providing information within the University of Birmingham, certainly in the foreseeable future. It is unlikely that printed materials, especially archives, and particularly in the Arts and Humanities areas, will ever become redundant. Both the print-only and virtual-library models have limitations; the hybrid library can take the best aspects of each to provide the best overall resource.
Appendix 1

**BUiLDER: Strategic Audit Interview questions**

1. Which library services currently provided by Information Services could usefully be transferred to electronic or networked systems? e.g. short loan collection, self-ordering of books, inter-library loan delivery, journals, etc.

2. In your view, to what extent do users value electronic information sources? Are all types of electronic information sources valued to the same degree? e.g. CD-ROMs, Web, local information resources. Do these services hold the same value to users as printed information sources? Does the value lie in the ease of access to information or in the quality of the information itself?

3. Approximately what is the ratio of printed information sources to electronic information sources in your subject area? What ratio do you envisage in five year’s time? How are printed and electronic information sources related? Can they be integrated so that users can access them side by side or are they always likely to be separate? Are there any barriers specific to accessing and using printed or electronic information sources in your subject area?

4. Are there any special research collections in your subject area which are available in digital format over the networks? Do you or your colleagues make use of these collections? How useful are digitised collections for research in your subject? Does the usefulness of electronic collections differ to that of printed special collections?

5. Are there any electronic information sources in your subject area which communicate research findings - e.g. electronic journals or pre-print services? Do you use any such sources? Do you value electronic and printed sources differently - e.g. is one format more authoritative, more accessible or more relevant that the other format?

6. What roles can a library or information service play in facilitating teaching and learning across the University? Specifically, what roles might electronic and networked information services and resources play in the delivery of teaching and learning?

7. Will the introduction of electronic and networked information services and resources alter the direction of the University as a whole, for example, by changing its market or its mission? In which ways might it affect the University direction?

8. What do you think is the relation between the costs of printed and of electronic information sources? Is one source more cost effective? - which one? - is this likely to remain the case over the next five years?

9. Is the hybrid library and end in itself or is it just a stepping stone toward the virtual library?
## Appendix 2

### List of interviewees

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof A.M. Cruise</td>
<td>Head of School of Physics and Astronomy</td>
</tr>
<tr>
<td>Prof W.F. Doe</td>
<td>Head of School of Medicine</td>
</tr>
<tr>
<td>Prof D. Carroll</td>
<td>Head of School of Sport and Exercise Sciences</td>
</tr>
<tr>
<td>Prof S.P. Limbrey</td>
<td>Head of School of Historical Studies</td>
</tr>
<tr>
<td>Prof H.R. Thomas</td>
<td>Head of School of Education</td>
</tr>
<tr>
<td>Prof C.P. Rickwood</td>
<td>Dean of Faculty of Arts and Social Sciences</td>
</tr>
<tr>
<td>Prof F. Young</td>
<td>Pro-Vice Chancellor</td>
</tr>
<tr>
<td>Prof D.R. Westbury</td>
<td>Vice-Principal</td>
</tr>
<tr>
<td>Dr C.D. Field</td>
<td>Librarian and Director of Information Services</td>
</tr>
<tr>
<td>Ms K.A. Stanton</td>
<td>Assistant Director of Information Services</td>
</tr>
</tbody>
</table>