# Planning the digital library: a virtual impossibility?

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*The relationship between information technology, books and people is a complex and evolving one. Information technology has reinforced the role of libraries rather than replaced them. Library buildings continue to be important 'places' for learning and research in the electronic age. Creating space with suitable provision for electronic services has become one of the major challenges in designing libraries.*

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**Introduction**

When I last addressed a UKSG conference some ten years ago I reflected on rebuilding the libraries in Kuwait after the Gulf War. I am reassured that we are still considering library space today. Digital services have grown dramatically since then and creating space with suitable provision for electronic management and delivery has become one of the major challenges in designing libraries today. I will explore the qualities of academic library space and recent trends in library design. I will then touch on the relationship between library buildings and information technology and on the future of the library as a 'place' in the electronic age.

Academic library space has a number of important qualities. Ideally, it should be functional, adaptable, accessible, varied, interactive, conducive to work, environmentally suitable, safe and secure, efficient, suitable for information technology and it should have 'oomph'. These qualities must be skilfully combined to create distinguished, satisfying and inspiring new libraries.

We are seeing a growing diversity of imaginative designs. Greater use is being made of daylight and passive ventilation. Interiors are enhanced with cultural artwork and a range of lighting. Greater attention is being given to noise management, security, disabled access and provision for information technology.

**Some questions**

There are a number of important questions for us to consider. What should an electronic library look like? How do we achieve a high quality electronic learning environment? How do we convert traditional space for electronic delivery? Indeed, do we need library buildings at all in the electronic environment?

Unfortunately, I don't know the answers to all these questions. The whole area of electronic libraries is full of ironies and contradictions. Despite all our professional attention, we should appreciate that we are very much at the beginning of an adventure and that there are no established rules for developing digital libraries. Progress is often made in surprising ways. It is, therefore, difficult to predict the nature of the space required for an uncertain electronic future.

**Space utilisation**

The Joint Funding Councils' Space Management Group, of which I am a member, is looking at space throughout the sector and there is a concern about the poor utilisation of space in universities. This is because the approach is largely based on traditional entitlements and hierarchical allocations, and universities seem to have ignored the new approaches and electronic opportunities adopted by the modern corporate world. Here the emphasis is on downsizing, flexibility, sharing, open plan, hot desking and plug and go. The Group appreciates that changing the use of space in universities is as much a cultural issue as a financial one, and that there will be a need to change attitudes, perceptions and aspirations within the sector.

Libraries have not been discussed specifically but we must get the message across that we make good use of space. It is understood that libraries provide important social as well as scholarly space, particularly for the growing number of undergraduates who all need a place to study. It has been suggested that the research library could become a networked electronic service, but this view rather ignores the space needed to house the wonderful special collections found in many of our major research libraries.

**People and culture change**

*"We shape our buildings, and afterwards, our buildings shape us"* – Winston Churchill

An imaginatively designed new campus, like our new award-winning riverside campus at the University of Sunderland, serves to remind us just how new buildings can help to change the culture of the organisation. Cutting edge facilities, including a 500 PC terrace, a lovely library and our new digital media school, are important symbols of both the physical and skills regeneration of the city.

Creating new library space is a unique opportunity for managers to change the culture of the library and to ensure the successful delivery of electronic services. Planning libraries is essentially about people, or rather it is about designing space in which people can interact with the collections, information technology and services they require. It is people who design libraries, people who deliver services and people who use them, and recent trends emphasise this 'people-centred' approach to planning.

**Future proofing**

*"All buildings are predictions. All predictions are wrong"* – Stewart Brand

One fundamental question is how far ahead we should plan? Any predictions about the size and nature of the buildings required for the future will be influenced by our view on how library services will be provided and used in the networked information age. Future-proofing in a relatively new and rapidly-changing situation can be difficult, but it is clear that IT-based services are increasingly heavily used in libraries and that the cost and disruption of trying to make suitable provision at a later date may be prohibitive. Pragmatists might suggest that we should look as far ahead as we can, or perhaps as far as we can afford.

**A lot of it about**

Despite some almost reckless predictions about the end of libraries and their book collections, due to the rapid growth in networked electronic information and the use of the Internet, universities continue to build new libraries and refurbish existing buildings. In the last ten years, there have been more than 100 new academic library projects in the UK costing an estimated £350 million. In the USA, 42 new academic library building projects were completed in 2000-2001 alone at a cost of some $416 million.

**All shapes and sizes**

There is a growing diversity of imaginatively designed new library buildings and each

represents a particular vision of what a new library should look like.

National libraries are often grand, prestigious 'monumental' buildings, and none more so than the impressive British Library at St Pancras in London. The piazza, enhanced by a striking statue, provides a welcome new space in central London and perhaps an opportunity for a wireless network where people could access serials on their laptops! The attractive lofty reading rooms with reflected light are well provided for information technology. The new National Library of Scotland in Edinburgh is an ingenious design in which the services (and staircases) have been moved to the perimeter where they can be maintained and replaced without entering the building. Cabling can be distributed virtually to any point through suspended floors. The net-like appearance of the building with visible bright yellow staircases are distinctive features about which opinion varies.

New university libraries at Cranfield and Thames Valley University are 'glazed envelopes' inspired perhaps by the simplicity of the form of barns and hangers. Users of these new library buildings are enjoying the variety of daylight and sunlight through larger windows, and welcome views of the outside world, but these large glazed areas also present some challenges for the control of thermal gain, glare and noise. The colourful interior at Thames Valley provides an interesting environment for a PC cluster. In contrast, the archive at Newnham College in Cambridge is designed specifically to house the College's collection of rare books rather than scholars and their information technology.

**Qualities of academic library space**

We can identify a number of important qualities of good academic library space and we can interpret these in relation to electronic services. It is suggested that ideally academic library space should be:

- functional
- adaptable
- accessible
- varied
- interactive
- conducive to work
- environmentally suitable
- safe and secure
- efficient
- suitable for information technology
- 'oomphy'

Clearly, the priority given to each of these qualities will vary according to the mission and culture of the university, and to the rôle and aims of its library service. They are intended as an indicative set of qualities and should never be taken as a prescriptive set of solutions. Inevitably, there are tensions and even conflicts between these qualities and also within each of them, and achieving them has resource implications.

Although the emphasis will be different when building a traditional library or a learning centre, the qualities are equally relevant to all space planning exercises: a new library or extension; a refurbishment or adaptation; making better use of existing space; or, indeed, a mixture of these. The discussion concentrates upon university libraries, but they also have relevance to national and public libraries and they could be described as the qualities of good learning space in general.

*Functional – space that works well, looks good and lasts well*

We should be aiming to design libraries which are functional, easy to use and economical to operate. New space must enable the library to fulfil its role and must facilitate the delivery of high-quality services. Functional interests should take priority over any purely aesthetic considerations, but we do want libraries that look good as well. New space must enable the library to develop and provide services that are responsive to the changing needs of the academic community. The design should recognise the crucial importance of people, books and information technology, and the dynamic relationship and complex interactions between them.

*Adaptable – flexible space, the use of which can easily be changed*

One of the few certainties in planning libraries is the almost guaranteed uncertainty relating to future use, particularly in relation to information technology, organisational structure and user behaviour. It is important to achieve a high degree of flexibility in the building so that the use

of space can easily be changed with the minimum of disruption merely by rearranging the furniture, shelving and equipment. Achieving long-term flexibility can be more costly than delivering short-term functionality, and planners are now more pragmatic, choosing an appropriate balance between cost and adaptability requirements.

It is generally held that the floor loading should be sufficient for bookstacks throughout the building. The growing use of information technology, often at the expense of bookstacks, has challenged this view. Some learning resource centres, housing predominantly IT-based resources, have been constructed to office, rather than traditional library, floor loading standards. However, any potential savings should be carefully assessed against the loss of long-term flexibility.

*Accessible – social space which is inviting, easy-to-use and promotes independence*

The library is the central academic focus of the university and has a strong social role within the institution. It should be as accessible as possible, encouraging and even inviting people to make full use of the services provided. We must provide for the growing diversity of users and their learning styles, but we know relatively little about the nature of e-learning.

Access should be as clear and straightforward as possible, requiring some but not too many additional signs and guiding. Great strides have been made in providing attractive, legible and flexible signage systems, and we are now seeing the use of multimedia guides, digital signs and plasma screens.

The layout should be self-evident, requiring little assistance from library staff, and it should facilitate independent study. The design of entrance areas is changing, particularly as libraries have become busier and have installed access control, smart cards and self-service systems. The growth of 24-hour, seven-day services requires attention to the security and robustness of the building and its collections, furniture and equipment, and to the safety of readers and staff.

The design must meet the current legal requirements for access by those with disability and learning differences, not least because good design for disabled people is generally good design for the able-bodied. The Special Educational Needs and Disability Act makes discrimination against disabled students unlawful and requires institutions to make 'reasonable adjustments' to ensure access by disabled people. The provision of assistive technology and the design of computer interfaces are but two key areas to be considered.

*Varied – with a choice of learning environment and for different media*

We should provide a variety of study environments to suit different learning styles and the needs of researchers. Students should be encouraged to learn at their own pace and in their own time, with provision for quiet study, independent learning and group work. The hybrid library must, of course, provide access to both traditional and electronic resources in ways that respond to the needs of the curriculum and scholarship. The huge variety of reader places ranges from single person to multi-person tables of various shapes, casual seating, study rooms and group study facilities. Each should be capable of providing access to a PC. Some readers like an 'active' or noisy social learning environment: others prefer a quiet study environment with good acoustic and visual privacy, and this can be achieved to different degrees with table dividers, book stands, mesh screens and carrels. Facilities are increasingly provided for e-learning and information skills training and other seminars.

*Interactive – well-organised space which promotes contact between users and services*

We must achieve an appropriate level of interaction between the space given over to the collections, services, readers and information technology. The well-organised library not only makes optimum use of the space available but also promotes interaction between people and encourages the use of services. The main counter, enquiry points and information skills training rooms are key areas of interaction that are affected by electronic delivery.

*Conducive – high-quality humane space which inspires people*

As the academic heart of the university, the library should convey a sense of quality and

value. The ambience should be conducive to academic work and reflection, and should encourage, and even inspire, use. Readers, many of whom study for long periods and in increasing numbers, should feel comfortable and safe.

Imaginative architecture and varied internal spaces all contribute to the ambience of the learning environment. This can be further enhanced by paintings, sculptures, stained glass, internal gardens and other 'cultural artwork'. An investment in a high standard of furnishings and finishes will also create this sense of quality and will withstand heavy use over an extended period with the minimum of maintenance. The library should be much more than an unimaginative 'swotting shed' with a high density of regimented study places.

Noise, particularly from computer clusters and readers themselves, is an increasing problem in libraries. Planners are paying considerable attention to the management of noise in new buildings. Ironically, this is even more important in libraries where talking is permitted, because effective noise management enables users to interact with each other without disturbing others unnecessarily. One fundamental dilemma is the design of the staircases in the library. Some buildings are designed around an open central staircase for transparent access and airflow considerations. In others, planners have contained the inevitable noise associated with readers moving up and down the building by enclosing the staircases.

*Environmentally suitable – with appropriate conditions for readers, books and computers*

Suitable environmental conditions are required, not only for the comfort of readers, but also for the efficient operation of computers and the preservation of library materials. Ideally temperature, humidity, dust and pollution levels should all be controlled. Natural or passive ventilation have become common in new buildings, providing an affordable, sustainable and people-friendly solution. Any building or energy management system fitted should be designed to the lowest common denominator of building management. The library should also be environmentally appropriate.

The ambient lighting, whether natural or artificial, should be sufficient for both bookstacks and reader places, and must take account of the growing use of computer terminals by readers and library staff. Task lighting or individual table lights have traditionally been used to upgrade the lighting at the reader's desk, but we must make sure the design does not get in the way of installing PCs. Large glazed areas mean that users can enjoy exterior vistas and natural daylight, but double and even triple glazing, tinting, solar film, blinds or architectural shading are necessary to alleviate the worst effects of noise, solar gain and solar glare. Atria can introduce welcome light and natural ventilation to the centre of large buildings.

*Safe and secure – for people, collections, equipment, data and the building*

There are security risks associated with the building, the people using it, the collections, the equipment and also the data. The design must be in accordance with current health and safety legislation and particular attention should be paid to the ergonomic design of workstations, to securing laptops and other computers, and to operation during non-standard working hours. Unfortunately, good security measures can sometimes conflict with convenience, aesthetics and even safety.

*Efficient – economic in space, staffing and running costs*

Libraries must be as efficient and economical to operate as possible. For example, considerable skill is needed in designing library staff areas in which extensive use is made of information technology. It is worth mentioning that some universities have begun to compare the relative life-cycle costs of developing electronic and traditional libraries.

*Suitable for information technology – with flexible provision for users and staff*

New space must allow the library and its users to benefit fully from rapid advances in electronic information networks, e-learning materials, library automation and automated building management systems. Indeed, we should be planning buildings to surpass the demands of the Internet generation. Even though only about 20% of reader places in university libraries in the UK have computers at the moment, the number of

computers and peripheral devices used in libraries continues to grow at a significant rate, and readers are also bringing in their own portable machines. The ultimate challenge is to have the capability of a fully networked computer at virtually any point in the building and to provide a conducive environment suitable for the use of that computer.

Effective planning relies on the combined wisdom and experience of architects, librarians, computer experts and networking specialists. A suitable proportion of the building budget, typically 5-10%, should be devoted to information technology provision to fund the cabling, active equipment, connections and hardware required, together with suitable safety, security and environmental measures.

We must ensure a high bandwidth network infrastructure. Most new libraries are fully wired-up and considerable attention is paid to getting the cabling and trunking around the whole building. Wireless networking is now more commonplace as wireless LAN products become faster and cheaper, despite some concerns about reliability and security. Unless laptops are used, an electric supply is still needed for PCs and other equipment. Docking stations are required for readers to connect their portable computers to the network, and particular attention should be paid to the quality of the frequently-used connections provided.

Planners may choose to wire up all the study places or they may, for reasons of cost, choose to wire up a certain proportion of them. Computers are often arranged on tables around the perimeter where they can easily be served from the wall but sometimes they are placed in the centre of the building to avoid problems of solar glare and gain. In many libraries computers are simply placed on ordinary tables, and this gives the most flexible arrangement, but in others specially designed computer tables are used. The design of workstations for both readers and library staff should take account of the appropriate health and safety regulations. The large number of wires in networked libraries makes wire-management in the furniture a necessity, both for safety and aesthetic reasons, and IT workplaces should be provided with fully adjustable chairs.

We should consider the merits of distributed PC provision, with proximity to the collections and other information sources, and of separate clusters of machines, with the benefit of centralised management and support. Machines can be arranged in separate rooms or in open plan areas. Clusters often double up as teaching areas too. In designing the layout, there is an inevitable tension between achieving the maximum number of machines and creating an attractive space which is conducive to learning. Large clusters can produce a surprising amount of noise and heat, and care must be taken to ensure fire protection and security.

More space is being given over to IT support, printing services, information skills training and distance learning services. Self-issue and return systems have the potential to radically change our approach to designing entrance areas and counters, since readers can undertake these circulation transactions themselves virtually anywhere in the library. Smaller counters may be required to deal only with those transactions where staff intervention is really necessary, and the design should encourage the interaction between users and staff rather than the circulation of books. The use of card-entry systems and smart cards also has design implications.

*Oomph – capturing the mind and spirit*

The eleventh and almost indefinable quality is best described as the 'oomph' or 'wow' factor. Skilful architects and planners will achieve an appropriate balance between all these qualities, creating inspiring buildings with distinguished features and satisfying spaces which capture the minds of users and the spirit of a university.

**The planning process**

A major building project is substantial managerial challenge and the librarian has a unique responsibility to ensure a good building which is capable of delivering high-quality services to generations of users. The librarian must have a strong vision for the new library and must communicate this vision to all those involved in the planning and design process.

Both architect and librarian must bring their vision and respective skills to this creative process which, inevitably, has its creative tensions. Not all architects will be stimulated by the aesthetic prospect of large numbers of books and transitory information technology. But, as a

rule, the best libraries emerge when there has been a strong shared vision and good communication between all those involved in the planning process, especially between the librarian and the architect.

**Some design trends and developments**

We are seeing a growing diversity of wonderful new library buildings in which exciting architectural expression, satisfying internal spaces and good functionality have been successfully combined.

In general, there is a growing recognition of the social, cultural and heritage role of libraries as places where people interact. The increased use of glazing means that people can enjoy the benefits of daylight, sunlight and welcome views of the outside world. Natural and passive ventilation systems are replacing totally artificial environments. Interiors are enhanced with cultural artwork and a range of lighting. Greater attention is being given to noise management, security, 24x7 access, access for those with disability and, of course, provision for information technology.

Interior designers recognise that even in the digital age, libraries are 'human-centred environments' which should have a strong sense of place. The library may become more like the living room, providing the emotional space for social interaction within the community. Trends in retailing suggest that library design will be influenced by entertainment and technology and the need for 'food with everything'. There is considerable interest in the innovative design of spaces both for private and social learning in galleries, museums, libraries and other public places.

Many new academic libraries remain 'standalone' projects but, as academic institutions increasingly work in partnership with other bodies to broaden participation in learning, we are seeing more innovative 'joined-up' building projects. Exciting new joint amenities are emerging from the closer working relationship between libraries, museums and archives.

**Libraries and information technology**

The relationship between information technology and libraries is a fascinating and evolving one. Some people in the 1970s and 1980s believed that libraries would disappear and even now some Vice-Chancellors suggest that we do not need new library buildings. However, splendid new library buildings are still being constructed, and libraries are actually moving from strength to strength. Far from libraries being displaced by information technology, the information technology has moved into libraries. Electronic services are very popular in libraries and have raised the expectations of users who now require ubiquitous 24-hour access to these services. There is also greater use of laptops, wireless networking and portable devices. Although book loans may have fallen in some libraries, electronic services generally stimulate demand for traditional services. As well as making heavy demand on library space, information technology has also increased the cost and complexity of library buildings. The planning challenge is to design a conducive environment suitable for the hybrid library which offers both electronic and traditional services, and one which recognises the dynamic relationship of people to all of these services.

However, there can be little doubt that information technology will have an effect on the need for library space in the long term. As networking, electronic publishing and digitisation progress, the exciting potential to deliver services directly to end users, whether on campus, at home, or at work, will almost certainly reduce the need for ever-expanding traditional library buildings. On the other hand, buildings continue to be required to house growing printed collections and special collections, many of which may never be digitised and need to be preserved for future generations.

**The library as a 'place'**

The future of the library as a physical 'place' has been a matter of considerable professional speculation and debate. Despite some hasty predictions about the imminence and inevitability of the virtual electronic library, universities around the world continue to build libraries in which teaching, learning and research can be pursued often, as it happens, with growing printed collections.

These new buildings continue to provide the 'place' where people can come together,

preferably without disturbing each other too much, to undertake a number of important activities. They come in increasing numbers to study, learn, reflect and exchange ideas. They consult the collections, retrieve information and use the computers provided. They seek the assistance and support of trained information professionals, and they make use of the whole range of managed services provided, including information skills training. Importantly, libraries provide access to information and information technology for the information 'have-nots'. The buildings are the hub for distributing networked services to off-campus scholars and learners, and they continue to house growing traditional collections and special collections of important research and heritage materials.

Although the balance between these activities is likely to change, the library building remains the important 'place' where all these essential services can be conveniently provided, even in the virtual age. It is interesting that many of the most automated libraries in the world are still buildings and most often very pleasant ones too.

Libraries remain amongst the most socially-inclusive, enduring and well-used 'places' in modern society, and creating good new library buildings is critical not only to the future of our universities but also to the intellectual capital of our countries.

We are witnessing unprecedented and dynamic change in society, higher education, technologies and management. These trends, and the considerable challenges they present to planners, are likely to continue at an ever-increasing pace. Tomorrow's libraries will look and feel very different 'places' from yesterday's buildings. In planning and designing these important new 'places', the library manager must enable our new buildings to play a full part in education, scholarship, culture and economic development. Indeed, successful new libraries encourage even greater use, often stimulating a two- or three-fold increase in demand.

*"If you build it, he will come"*
(Field of Dreams, 1989)