
Collections to Connections: Changing Spaces and New Challenges in Academic Library Buildings

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ABSTRACT

The article looks at changes in information provision and their significant impact on the development of the design of academic library spaces over the years. The history of the academic library as a building type is examined, and the move from the collection-dominated library buildings of the nineteenth and twentieth centuries to the service-rich, user-focused ones of the twenty-first century is explored. Recent trends are identified, drawing on a number of mainly UK and other European examples. The effect of increasing availability of e-resources, new technology, and changing methods of teaching, learning, and research on design is also considered. Other issues covered in the paper include the importance of the design brief or program, interior space, fittings and fixtures, and finally the need to reflect on the success or failure of building projects through post-occupancy evaluation.

INTRODUCTION

The function of a library as a center for resources and ideas is to provide information to its users. The library as a gateway to knowledge remains as true for the building that welcomes in readers to peruse books and journals as for the one that guides its users to electronic resources throughout the world. Although this function has changed little in the history of the university library, the form in which information is provided and the way it is delivered to the end user have developed in new directions. The pairing of books and architecture is a long-standing one that has had a significant impact on the design of academic libraries, and in many ways the relationship of books, architecture, and now electronic resources has sparked off a new interest in library building design.

The design process for any building type is essentially a problem-solving activity, and the designing of libraries is no exception to this. The bringing together of reader and knowledge has always been a challenge throughout the history of academic, or indeed any, libraries. Brawne (1970), in the introduction to his guide to library building design, written at the height of university expansion in the UK, takes the fifteenth-century painting of St. Jerome in his study by Antonella da Messina as the quintessential expression of both the problem and solution. It is a painting that is frequently used in lectures and publications on library design as it encapsulates the relationship between the scholar and the tools of the trade. It is that relationship that dominates the thinking of library planners and designers (clients and architects) throughout history, perhaps most famously in relatively recent times in Louis Kahn's 1960s library for Phillips Exeter Academy in New Hampshire, where meticulous attention to detail in the use of materials and natural lighting provides high quality user spaces. The scale of course has changed, but, interestingly, after a period of growth in both collections and the number of people using them, came the concept of the self-renewing library with the withdrawal of old stock making room for the new, off-site or shared storage, and the digital revolution. These trends tipped the balance in the twentieth century back in favor of users and their spaces rather than the domination of collection space. The modern university library is all about making connections—connections between different groups of library users, connections between library users and library staff, connections between library users and resources.

HISTORICAL BACKGROUND

Edwards (2009) points out that a “critique of the history of libraries helps clarify the issues designers and libraries face to-day.” He and others such as Bahr (2000) and Graham (1998) have dealt with this subject in some depth, and only a brief overview is included here.

The academic library has its origins in the ecclesiastical collections of the pre-Gutenberg era, and books such as *The Most Beautiful Libraries of the of the World* (Bossler, 2003) showcase the forerunners of today's libraries with lavish illustrations of great monastic libraries, special libraries, national libraries, and academic libraries. Libraries such as Jacopo Sansovino's masterpiece in Venice, the Library of San Marco, housed famous manuscript collections and contained generously proportioned reading rooms and sumptuous wall and ceiling decorations by the great artists of the day; there are many such examples. The combination of great libraries, great architecture, and great art is one that, albeit in a different form, we should strive to cultivate today.

In the United Kingdom, university libraries were founded in the colleges of Oxford and Cambridge in the thirteenth century followed by those of the Scottish universities in St. Andrews, Aberdeen, Glasgow, and

Edinburgh in the fifteenth and sixteenth centuries and then by Trinity College in Dublin in 1591. In this period readers still had their individual enclosures, not unlike the monks of earlier times. Collections were still on the whole small enough for readers to have immediate access to them, and the only consideration was the security of the books since they were items of great rarity. Hence the development of chained libraries and closed access stacks, which seems such an anachronism today. Many fine architects, such as Sir Christopher Wren at Cambridge, are associated with library buildings throughout the centuries. The Wren Library (1684), with its magnificent arched windows and carved bookcases, cleverly solved the problem of masking the fact that, in order to accommodate the bookcases, the upper story had to be taller than the lower. This was done by making the elevations appear as if the stories within were of equal proportions. The rotunda form enjoyed some popularity in the eighteenth century as seen at James Gibbs' Radcliffe Camera in Oxford as well as in the former Reading Room in the British Museum in London. Echoes of this can be seen in Gunnar Asplund's splendid cylinder within a box structure for Stockholm Public Library of 1928. This iconic building was recently the subject of a hotly contested design competition for its extension, although the project is currently on hold due to funding issues. The relationship between pure geometry and intellectualism is a recurrent theme in many more recent library designs such as Mecanoo's work at Delft and Snøhetta at Alexandria.

The nineteenth and early twentieth centuries in the United Kingdom saw further university growth with Durham opening in 1832, Queen's College, Belfast, in 1849 (achieving university status in 1908), and big city universities such as London and Manchester in 1836 and 1880, respectively. These were closely followed by Birmingham, Liverpool, Leeds, Sheffield, Bristol, and many more, with the concomitant growth in books and readers. Libraries became more open and no longer the haunt of the privileged few. At this stage, libraries were zoned into reading rooms, service areas, and book stacks, with much material still on closed access. However, the emphasis was beginning to shift from books to readers.

The next wave of university growth in the UK, and hence of academic library buildings, came in the 1960s with the establishment of the new universities at York, Sussex, Stirling, Lancaster, Essex, East Anglia, Kent, and elsewhere. Architects, such as Basil Spence at Sussex; Denis Lasdun at East Anglia; and Robert Matthew, Johnson-Marshall & Partners at York, were employed to design libraries as part of the master plans for these universities. This had the advantage that the libraries for the new universities usually occupied prime sites at the center of the campus. The entrance halls were welcoming and spacious, designed to draw in students hurrying from campus halls of residence to lecture rooms, and they were dominated by circulation desks and catalog cabinets. There was much

debate about the relative merits of open and closed access stacks in the 1960s. Although space could be saved by using compact shelving in storage areas, most of the libraries designed at this time favored open access with reading spaces placed adjacent to, or even interspersed with, the stack areas. Library programs increasingly asked for flexibility between stack and reading areas, which in turn had implications for floor loading and lighting arrangements.

The 1960s also saw the design of a number of major library buildings at the older universities. The Cambridge University History Faculty Building, of which the library was a key component, was the subject of a limited competition in 1964. The building married high-tech architecture with contextual sensitivity through the use of glass and steel detailing alongside brick walls and platforms. As a library it owed more to the great reading rooms of the nineteenth century with their emphasis on security and supervision than to the more liberal approach of the new universities. The glazed corridors running round the upper parts of the library ensured that people moving around the building were always in visual contact with the library. The building is much beloved of architects but was not without its critics, as Stirling was big enough to concede by including a vitriolic piece published in the *Cambridge Review* of 1968 in his account of the project in *James Stirling Buildings & Projects* (Stirling, 1975, p. 91). Cambridge University also has a plethora of impressive recent college libraries, as has been documented by Wilson (2006), in addition to the Wren Library referred to above.

Another competition-winning library of the 1960s that sparked off much debate at the time and has also recently been carefully integrated into a new library complex, is the Ahrends Burton and Koralek (ABK) Berkeley Library at Trinity College, Dublin. An examination of the three libraries at Trinity tells us much about the history of libraries and the development of library building design. McParland (2001, pp. 151, 158), in recounting the tortuous tale of the building of Thomas Burgh's classical eighteenth-century building with its world-renowned first-floor reading room, the Long Room, notes that "so few people had access to the Library that the symbolical value of the building was unimpaired by its internal incompletion and total absence of books" (fig. 1). The building was eventually occupied in 1732; even then the storage of books was not a problem—there was more than enough room. To quote McParland again, what mattered "was the symbolism of the outward show, the *bella figura*." By 1967 it was a different story, and the new Berkeley Library was very much designed to increase the number of books available to readers and to welcome visitors into the catalog and bibliography area. It was not the most flexible of buildings, however, since some of its individual reading spaces were incorporated into permanent building elements and there was little room for expansion or rearrangement within the existing

structure. The architectural brief for the new library building, the Ussher Library, designed by McCullough Mulvin Architects/KMD Architecture, which opened in 2003, notes among the key needs to be addressed that there should be full provision for electronic information use alongside traditional printed materials, provision of network connections to databases anywhere in the world at every user's desk, and enhanced research and learning spaces in an environment conducive to study (Trinity College Library, 1997).

At much the same time as Stirling was working at Cambridge and ABK in Dublin, Basil Spence was working on the new library for the University of Edinburgh. A far cry from one of its predecessors, William Playfair's early nineteenth-century Library Hall, with its emphasis on accommodating ever-expanding collections in wall shelving and on galleries, the new library on George Square seemed very user-friendly. It is currently undergoing major renovation and remodeling. As a student of the 1960s who used the library when it was squeaky clean and new, I found revisiting it recently a fascinating experience. By comparing the plan of the entrance floor then and now, it was telling to note that the current periodicals reading room of the 1960s has become a very snazzy and busy café with wireless networking, the catalog hall is now a large entrance area with exhibition space, and the acquisitions and cataloging workrooms now house The Hub (heavily used books) where undergraduates find their key course texts. These alterations in the layout of the building neatly encapsulate some of the changes in the world of libraries and information that are driving the need to change the design approach for library buildings.

TURN OF THE CENTURY DEVELOPMENTS

As the millennium approached, the digital or electronic age dawned. What started out as a trickle of scientific journals in electronic form turned into a deluge of e-journals soon to be followed by e-books. There was much talk of the hybrid library and how to achieve the correct balance between print and electronic resources—that “link between the legacy of Gutenberg and the byte of the digital age” that Michael Brawne refers to in his introduction to *Library Builders* (1997). The naming of libraries became an issue. Many libraries morphed into learning resource centers, learning zones, cyberspaces, Idea Stores, and the like.

In 1993, library building development in the UK received a key fillip with the publication of the *Joint Funding Councils' Libraries Review Group Report* (Follett Report) (Follett, 1993, p. 41). The Review Group recommended that there should be a medium-term program providing funding particularly for institutions where increasing student numbers were putting pressure on available library space. The program was intended to promote the efficient use of space through new build or adaptation of existing areas to encourage more flexible and better management of



Figure 1. The Berkeley and The Old Library, Trinity College, Dublin. Reproduced with the permission of Dr. E. McParland.

library space. As a result of the Follett Report, some one hundred new academic library building projects were initiated in the late twentieth and early twenty-first centuries in the UK.

Nonetheless, at the turn of the century, the prophets of doom were forecasting the demise of the physical library as a building type. Academic libraries in particular, it was said, would dwindle in importance—and size. Our users, we were told, would want everything delivered to their desktops at work or at home, and our funders would be unwilling to spend money on soon to be redundant spaces. Certainly the impact of technological, pedagogical, and social changes on library design has been marked; the library as a cultural and social symbol, a place for community interaction and celebration of learning continues to be hugely important. Although libraries still need to house collections, they also need to provide a sup-

portive environment for navigating the world of information available beyond the library's walls. The challenges facing library planners and designers of the twenty-first century are different from those of previous generations as we move away from the collection-based libraries of the past to the user-focused, service-rich libraries of the future—they are no less exciting or demanding.

RECENT TRENDS

At first glance the most creative responses to the challenge of enticing people into libraries in the electronic age seemed to come from large national or public libraries. A search of both the architecture and the library literature returns references to a number of key libraries, which herald a new approach to designing information spaces in the twenty-first century. These include the library at Alexandria, with all its deep historical and symbolic references, designed by the Norwegian architects Snøhetta. Built at the start of the twenty-first century, this library, with its vast reading rooms cascading down seven terraces and its circular form echoing that of the harbor on which it sits, aimed to bring together the printed and the electronic worlds of knowledge as well as regenerate the seaport area of the city and act as a symbol of culture and national pride.

Another recent library building that took a new look at how to approach the bringing together of people and information and that has had a huge impact on the way architects and library managers look at designing libraries, especially public libraries, is OMA and Rem Koolhaas's 2004 Seattle Central Library. The intention here was to provide an information store giving equal priority to both new and old media through the provision of a four-tier book spiral with stacked and overlapping platforms, in between which are what are described as "trading floors" with a "living room entrance" (Futagawa, 2006). The clients are surrounded by information sources, and there is maximum interaction between them and the librarians who can provide expert help in exploiting all resources whether printed or electronic. This approach is as relevant to academic libraries in today's world as it is to any other type of library—large or small.

The public library in Amsterdam, designed by Joe Coenen, is another library that impressively manifests all that is best in contemporary library design (fig. 2). The influence of this building can be clearly seen in, for example, Cardiff's new public library designed by Building Design Partnership (BDP) with Stride Treglown Davies. Other recent award-winning public library buildings in the United Kingdom include those in Newcastle, Brighton, and Bournemouth designed by Ryder Architects, Bennetts Associates, and BDP, respectively. Mecanoo, the architects of the Delft University Library referred to below, have recently been appointed as architects for the new Birmingham Central Library, and preliminary

designs indicate that this will be a project to watch in the next few years to identify further future trends. A recent interview with Brian Gambles, head of Library Services (Owen, 2009), gives a clear hint as to what these might be. He refers to staff working alongside customers and there being a flexible and multiskilled approach to services. Other pointers include working with businesses and academics, a new partnership with the neighboring theater, a triage approach, and the use of volunteers—and this interview predated British Prime Minister David Cameron’s ambitions for the “Big Society,” in which citizens demonstrate a community spirit by undertaking voluntary work and organizing themselves to provide services otherwise provided by the state.

Changes in the public library sector are reflected in universities, and it could be argued (Edwards, 2009, p. 189), that in fact, university libraries have been leading the way in rethinking the building type. A significant factor relating to new uses of space within library buildings was that online catalogs had largely replaced the card versions by the turn of the century, key texts were increasingly available in digitized form, and automated storage and book retrieval mechanisms were being developed in some of the larger academic libraries. Freeman (2005), whose firm Shepley, Bulfinch, Richardson, and Abbott includes a number of recent academic library buildings in its portfolio, has noted that “Rather than threatening the traditional concept of the library, the integration of new information technology has actually become the catalyst that transforms the library into a more vital and critical intellectual center of life at colleges and universities today” (p. 2). He went on to say that although staff and students can access information from almost anywhere on and off campus, the library remains the focal point “where new and emerging information technologies can be combined with traditional knowledge resources in a user-focused, service-rich environment that supports today’s social and educational patterns of learning, teaching and research” (p. 3).

In the early to mid-nineties a number of universities were taking an integrated approach. The architectural brief for the Delft University of Technology Library stressed that what was required was a building for the future where computers were as important as books and where the technology was to be on display. Furthermore, sited next to the much-revered Van den Broek and Bakema auditorium, the building had to be both a landmark and yet sympathetic to its surroundings. The end result is a library tucked away under a vast expanse of grass roof on which students can, and do, walk and relax. A gently ramped flight of steps below entices people up and into the building. A vast white cone over forty meters high and floodlit at night pierces the grass roof and acts as a beacon at all hours. It is both spectacularly symbolic and functional as it lets in light. Although many of the books are stored in the basement, many are also stored in full view from ground floor to fourth-floor ceiling. Although the trappings of



Figure 2. Amsterdam Public Library. Reproduced with the permission of Matthew Stewart.

technology abound and electronic and global resources can be easily exploited, there is also ample opportunity to surround oneself with books in traditional study places and read in peace. Already this building is undergoing refurbishment, reflecting how quickly things change in the world of library building design.

Meanwhile in Japan there was a move to dismantle the conventional approach to library building and to bring various functions together in one complex. The Sendai Mediatheque by Toyo Ito, designed between 1994 and 2000, combining an art gallery, a library, a center for the visually and auditory impaired, and a media center of visual images, is one

example. In the financially constricted times ahead, this might be a more common model, particularly in the public library sector but also in the academic: the University of Worcester Library in the UK includes both learning and heritage facilities and integrates a university library with a public one, and is a forerunner.

Public access was also a requirement of the Brandenburg Institute of Technology (BTU) at Cottbus, where a competition was held in the 1990s for the modernization and development of their campus. The architects Herzog & de Meuron were commissioned to design a new library for BTU, which was to create a new image for the university. They concluded that what was required was “a landmark within the surrounding urban architecture that would communicate the new spirit of the university and relate to the environs in many different ways” (Enders, 2005, p. 56). Located at the main entrance to the campus, curved pathways lead to the glazed library building, and once inside, the library user is led through a variety of different-sized reading rooms. Some reading rooms are two or three stories high, giving a very spacious feel, while others are more intimate with lower ceilings. A vast almost sculptural spiral staircase cuts through the entire structure and links all the stories. Color is a major factor at Cottbus and indeed is a trend that is evident in many recent library projects. Six intense color bands run throughout the building with grey and white predominating in the reading rooms to aid concentration. Another trend of late in university library design has been fritted or printed glass. At Cottbus a white veil with texts and alphabets in different languages is printed on both sides of the building’s glazed shell. The printed pattern breaks up the reflection and softens the glass exterior. During the day, the interior of the building is concealed behind the façade; at night all is revealed.

Two other influential university library buildings completed in the first decade of the new century are those for the Free University of Berlin, designed by Foster and Partners, and that for the University of Utrecht, by Wiel Arets. Much has been written about new names for libraries in the twenty-first century—learning resources centers, Idea Stores, information centers, discovery centers, and mediatheques—but the nickname for the Philological Library in Berlin, completed in 2005, is perhaps particularly appropriate for an academic library. It was quickly nicknamed “The Berlin Brain,” both because of its physical form and also because of its function. This building reflects a number of trends with which library planners are currently grappling. It brings together the collections of eleven branch and departmental libraries and is a highly ecologically advanced building filled with natural light and air; and it utilizes technology to achieve energy efficiency and reduce its impact on the environment. It is not without its critics, however, with some claiming that function has been sacrificed to aesthetic priorities.

The University Library, Utrecht, contemporaneous with “The Berlin Brain,” has been described as “a place where they [people] can work in a concentrated fashion, but also one where they can meet other people without the need for any other stimuli except the atmosphere that the building radiates” (Futagawa, 2006, p. 304; fig. 3). Bas Savenjie, director of the library, notes the role of the library as a partner in education and research and states that it “prefers not to be invisible. In fact it needs to be a distinct presence . . . a symbol for the function of the library in all its aspects” (Arets, 2005, p. 20). The library at Utrecht encapsulates the changes in the library as a building type, typifies the coming together of old and new concepts, and points the way to the future. Here library users have plenty of study spaces to choose from and can move through different kinds of spaces and use different types of information resources. A great deal of thought has gone into finding the balance between concentrating and communicating, between the individual and the collective, between collections and connections. Staff, sometimes relegated to the bottom of the heap when space is being allocated, are safely and centrally located.

Color, as at Cottbus, is again important here: Arets’s approach is to use black for the ceilings and walls with a grey floor finish, which provides a sense of security and is not distracting for the reader. This monochrome approach is punctuated by startlingly bright red information counters, red seating, and white tables. Arets, like Herzog & de Meuron, and many others, also uses the technique of printing a pattern on the façade—in this case a plant motif on the glass and many of the concrete panels.

However, perhaps it is again to Japanese architects that we have to look for an indication of what is to come next. Shigeru Ban in the Seikei University Library in Tokyo (Webb, 2007) solved the problem of depriving students of their mobile phones—“a deprivation as cruel and unusual as denying wine to a sophisticated adult” (p. 64)—by creating a spacious, comfortably furnished glass-walled lobby as a decompression chamber between the chatty world and the quiet world for study. Even more recently the Japanese practice SANAA has designed the Rolex Learning Centre at Lausanne (<http://www.archicentral.com>), where the library is just one of a number of learning spaces on the menu. People can connect in the large open spaces or retire to enclosed areas if they seek privacy. The Learning Centre “is a place that will be full of unintended encounters, where you might bump into an old friend, become inspired by another work group, or discover your favourite book.”

In the UK, too, there have been a number of recent academic libraries of interest. Two examples of the leaders in the trend toward more technology-rich, user-focused libraries are the libraries for the University of Cranfield, designed by Foster and Partners, and the Learning Resource Centre at Thames Valley University, Slough, designed by Richard Rogers,



Figure 3. University Library, Utrecht. Reproduced with the permission of Matthew Stewart.

both completed in the 1990s. In the first decade of the twenty-first century, we have had the Warwick University Learning Grid, Glasgow Caledonian University's Saltire Centre, and the Information Commons at the University of Sheffield all breaking new ground in their different ways. The Warwick Learning Grid's open-all-hours, student-centered approach has led to changes in the main Warwick Library; the Saltire Centre's colorful, flexible, highly automated learning resources spaces bring student services together with careers, counseling, and financial services all sharing space with the library. This integration of services is particularly

important in a university with a high proportion of first-generation attenders and a large number of international students. The RIBA award-winning Information Commons at Sheffield picks up on the North American model of integrated learning environments; Sheffield's Director of Library Services also points to the influence of the new universities, the Norwich Millennium Library, and even some retail spaces, although the inspiration for the name actually came from the University of Auckland (Lewis, 2008, p. 41).

Queen's University, Belfast, recently opened its new library, designed by American architects Shepley Bulfinch Richardson and Abbott (SBRA), which combines traditional library spaces with the latest technology (fig. 4). It offers not only a wide range of formal and informal seating arrangements with plenty of space for group study but also nooks and crannies in which to hide away. It has excellent sustainability credentials as discussed below. Aberdeen University has recently appointed the architects, Schmidt Hammer and Lassen, who designed the acclaimed extension to the Royal Library in Denmark, the Black Diamond, to design its new library. As well as describing the building as a "dramatic addition to the architectural heritage of the City," the library website (University of Aberdeen, 2008) notes that it will provide "a modern, spacious, pleasing environment, with flexibility for single study, group work and social areas, with the latest online resources and technology." Like the University of Worcester and others, the University of Aberdeen is also keen to point out that the new library will benefit not only staff and students but also the local community and beyond.

There are many other examples of excellent new buildings—details of these (and particularly award-winners) can be found on the key gateway to library building information in the UK, the Designing Libraries website (<http://www.designinglibraries.org.uk>), which now incorporates the SCONUL academic library building database. The other invaluable resource for library planners is the JISC website on planning and designing technology-rich learning spaces (JISC infoNet, 2009).

Academic libraries are undoubtedly changing; rather than going into decline, however, they are taking on different roles to support new patterns of learning, teaching, and research. Those charged with commissioning new or refurbished buildings and spaces have had to consider the various trends and drivers for change when briefing their architects if their library building is to respond successfully to the particular needs of its own users and context in the twenty-first century.

DRIVERS OF CHANGE

Latimer (2010) has identified the following drivers leading to a changing approach to the design of academic libraries: the increasing availability of e-resources and the concomitant shift in the balance between printed and



Figure 4. Library, Queen's University, Belfast. Reproduced with the permission of Creative Services, Queen's University, Belfast.

virtual collections; technological advances such as self-issue/return, the automation of manual handling, the use of sorting robots, compact shelving, and RFID technology; social networking—the library as a meeting place; and the need to market libraries in the face of increasing competition from other information providers.

The digital age, contrary to predictions, has had a largely positive impact on library design. The increase in the use of IT and e-resources allows libraries to be more flexible and the spaces within them more fluid. Library spaces are no longer defined by the collections as in the past but need to encourage interaction between, and among, library users and

library staff. The technological advances referred to above are releasing library staff from routine tasks and driving the move toward a user-focused rather than a collection-based approach to both services and the layout of spaces. Library premises are no longer largely governed by the storage and display of resources or by the need for space-consuming issue and service desks but rather by the needs of users. And the creation of exciting and attractive library space has been shown to bring people into the physical library to use the virtual resources.

The library as meeting place is another well-recognized trend in library design. The concept of the library as a “third place”—a place away from both the workplace and the home to study in peace, work collaboratively, or socialize—has been much documented (Banning et al., 2006; Oldenburg, 2001). Closely allied to this is the emergence (or perhaps re-emergence) of the café culture in a library context. Learning cafés are now running successfully in many institutions and are popular both with students, as congenial places where imagination and creativity can have a free rein, and with administrators with an eye to financial profit. Boone (2004, p. 324) argues that they can act as a “potential reconciliation site between the monastic mission of academic libraries and the commercial realities they face.” Examples abound—learning cafés include the Saltire Centre at Glasgow Caledonian University and Northumbria University. Imperial College London, where the library extension includes a Learning Centre and café by Madoc Architecture, provides a particularly impressive array of options for its highly computer-literate student body (fig. 5).

The need for libraries to market themselves has become increasingly important, and this in turn has had an impact on library design. There is a strong need to create an identity for the library; as Arets (2005) has pointed out, a building that looks exciting on the outside will entice people in to find out what is going on inside. The library building itself becomes a marketing tool. The library at Cottbus has been visited by approximately 20,000 tourists since it opened in 2005 (Degwitz, 2010).

THE BUILDING PROGRAM

Some thirty or so years ago, the architect Faulkner Brown (1979) first listed his ten commandments for academic library planning. These were then updated by library director Andrew McDonald (2007), and even more recently by academic Brian Edwards (2009). Libraries need to be flexible, compact, accessible, extendible, varied, organized, comfortable, constant in their internal environment, secure, economic, and—the requirements added most recently—sustainable and having the *wow/x/oomph/uplifting* factor!

To turn theory into practice, the design team, including the commissioners of the building, must communicate well together. Dialogue, however achieved, is of paramount importance. Most commonly this is done



Figure 5. Learning Café, Imperial College London Library. Reproduced with the permission of <http://www.alanwilliamsphotography.com>.

by means of the library brief or program—a statement to the architect (and often to the funders as well), which should include the vision for the library that reflects the ethos and aims of the parent institution and has a direct impact on the design of the library building. The architect, library director, and university building director working on the Utrecht university library had dinner together every six weeks or so (a very civilized approach). Others work through a series of information sheets and updates as a project continues. Those commissioning the building need to have a clear idea as to what sort of library the users, including the library staff of course, need and want. This is particularly important in changing times. The brief should also record detailed requirements and distribution of space—user, collection, and service space needs—as well as the relationships among them.

When working on the recent *IFLA Library Building Guidelines* (Latimer & Niegaard, 2007), the contributors (architects and librarians) discussed the various recommendations and standards available around the globe for academic library buildings (DIN, 2009; Edwards, 2008). They came to the conclusion that although some basic space requirements needed to be provided, in today's ever-changing climate, a lot depended on individual needs, regional context, and aspirations; to be too prescriptive was less rather than more helpful. Instead, in the IFLA publication, Anders Dahlgren (2007a, 2007b) describes in detail how to determine and estimate library space requirements to suit local needs and services. The soon-to-be-published ISO standard on qualitative conditions and basic statistics for library buildings in relation to space, function, and design, which is based on the DIN standard, will be another tool for library designers and planners to use (O. Eigenbrodt, personal communication, July 17, 2010).

INSIDE THE LIBRARY

In the past the interior spaces of libraries tended to be dominated by the collections with much material in closed access storage and with vast runs of journals going back many years. Today the users and their need to connect with each other and with their resources take precedence. As Latimer has noted:

The greatest changes have taken place in the design and equipping of learning spaces, thanks to wireless networks and zoning. Where once there were serried ranks of seating with a small number of private carrels and a very small number of rooms available for booking, libraries now offer a whole range of study spaces and aim for more informal, random layouts providing every permutation from wide open light spaces to cozy nooks. Different operational zones are coded with sound and visual clues, layout and style of furniture to indicate silent, quiet or social areas. (2010, p. 32)

At Queen's University in Belfast, noise is further controlled through the use of patterned acoustic tiles. In most academic libraries it is the demand for group study rooms that is constantly increasing.

University libraries also need to cater for seemingly insatiable IT usage—all services available 24/7 with helpful informed staff on hand to guide users through the maze of information, unjam the printers and photocopiers, retrieve the missing Word document, and mediate between the contemplative and the conversational users. With the move to mobile technologies, students now need lockers in which they can safely leave their laptops and other equipment and preferably ones containing power-charging outlets.

Twenty-first-century libraries are places where all sorts of new technologies can now be found. Most have a significant number of self-issue and return kiosks with the resulting decline in dominant, centrally located

issue desks with their potential to form a barrier between staff and user right at the entrance to the library. Entrance areas now act as reception spaces sending out a more welcoming message. A glance through catalogs or relevant websites reveals a vast array of designs for slim-line and innovative transaction and enquiry points.

Shelving, too, has undergone a significant change in recent times with the industrial versions of the past being replaced by more stylish designs, which contribute to the ambience of the interiors in which they are placed. Compact shelving used only to exist in closed access stores but now often forms part of the open access collections. Some are moved manually or, as in the Bruynzeel Compactus system in the new library at Queen's University, automatically. Mobile shelving is very space-efficient and therefore cost-effective, as aisles are only created when needed. Shared off-site storage is a solution adopted by some libraries to release additional space. A recent approach to the storage problem that many libraries in the UK have now adopted is to share responsibility for holding low-use print journals. The UK Research Reserve (UKRR) is a collaborative distributed national research collection, which has released over twenty km of space to date in member libraries. These have used the space saved to create innovative social learning spaces and additional study spaces (<http://www.ukrr.ac.uk>).

Sustainability is a key component of any contemporary library building, and this is addressed elsewhere in this volume (see article by Brian Edwards). Library buildings have a major environmental impact, and this is increasingly being taken into account in new projects. In discussing the procedure to ensure that the new nine-story library at the University of Aberdeen is as green and efficient as possible, Chris Banks, university librarian, points out that the intention is to reduce unnecessary movement through the building so they "have moved offices around and taken other steps to minimize book miles" ("Leaner Operation," 2010). In the past, libraries often had uniform lighting throughout, but it is now recognized that areas of activity can be defined by varying the level of lighting and that localized low-energy task lighting is often more effective and preferred. As readers, and indeed library staff, like to work in natural light, seating areas are often now placed around the edges of a building with maximum daylight penetration throughout deep-plan buildings being provided by an atrium, as at my own university. The library at Queen's University, Belfast, also uses heat exchangers at the top of the atrium to help reduce the energy load and incorporates a high-tech system of sensors, controls, and automatic louvers to ensure that the temperature is kept at comfortable levels with a ground source heat pump assisting in providing cooling (Tennyson, 2009). Temperature problems seem to be one of the most common complaints in new library buildings, with users commenting that the buildings are either too hot or too cold. The use of environmentally sound materials,

rainwater harvesting, recycling/reuse technologies, and good insulation are all part of an environmentally responsible approach in twenty-first-century library design. This was addressed by IFLA in its most recent building guidelines (Wagner & Scherer, 2007).

A welcome trend, although one that perhaps reflects the great libraries of the past, is the inclusion of works of art in the building. Numerous examples abound. The French sculptor Marc Didou's *Eco* sits splendidly outside the McClay Library at Queen's University in Belfast, and an artwork by textile artist Michael Brennand-Wood has been especially commissioned for the atrium. The Worthing-based artist Bob Brighton created and donated the very effective artwork in the library at Imperial College London and in Sheffield University's Information Commons. Murals and sculptures feature in other recent buildings such as the Jubilee Library in Brighton and Cardiff Central Library. Scandinavian libraries frequently incorporate art into their building projects; one particularly impressive example of this being Södertörns University Library south of Stockholm, and there are many other examples around the world. Perhaps there should be a project to compile an art in libraries database if one does not already exist?

EVALUATION

Although much can be learned from the successes and failures of a new building, all too often either no evaluation is carried out or only a cursory one. In addition, as Suzanne Enright (2002, p. 42) points out in her comprehensive review of post-occupancy evaluation (POE) of UK library building projects, information is not disseminated "as quickly or as widely as it could or should—potentially delaying continuous improvement of library building design and post-occupancy performance."

There is certainly no shortage of information on POEs and general agreement that there is much to be gained by auditing building performance and client satisfaction. Still such feedback is hard to come by. In the UK the SCONUL Design Award process ensures that major academic libraries are regularly assessed. However, the judging panel use in effect the Faulkner Brown ten commandments mentioned above as criteria and do not claim to be assessing design issues in any depth. Architectural evaluations tend to focus on building services and are of limited value to library planners. The IFLA Library Buildings and Equipment Standing Committee is currently working on a POE project and hopes, by combining the skills of architects and librarians, to produce some guidance on technical and energy performance as well as user and management satisfaction. However, producing a really usable and useful document for those planning new library buildings is not an easy task. The issue of dissemination of information to those embarking on a new project remains.

CONCLUSION

Academic library buildings, like libraries themselves, are changing fast but not perhaps in the ways predicted as the twentieth century drew to a close. Certainly the name might have changed in some cases, certainly the building must now accommodate both the printed word and the electronic resource, and it must cater for all tastes: those who want to work alone or in groups, at desks or in comfortable chairs, in silence or surrounded by a hubbub of noise. As a vital building type, however, the library remains alive and well.

This paper has looked at the move from the collection-based libraries of the past to the user-centered buildings of today, where people connect with each other and with the services and resources provided and increasingly work collaboratively. Instead of a decline in the need for academic libraries, demand has actually increased, with e-resources and information technology being seen not as threats but as giving us the opportunity to bring in new users and use our space in different and innovative ways.

At the start of the century, we saw a number of major exciting new library buildings all over the world where electronic and traditional services coexist. They were designed as places where people would want to come even if, thanks to the impact of electronic resources available anywhere any time, they didn't actually *have* to come. Social spaces such as Internet cafés became increasingly prevalent and a sustainable approach to design a *sine qua non*. This will almost certainly continue to be the trend as will the use of wireless networking and mobile technologies.

So what next? Buildings such as Cottbus and the Rolex Learning Centre perhaps indicate the future direction of libraries, but then again funding problems are having an impact and it would seem likely that we may see fewer iconic buildings in the next ten years. Rather, the approach will, in all likelihood, be one of refurbishment and remodeling of existing space to meet new demands, as seen, for example, at the David Wilson Library at Leicester University. Buildings will need to be cost-effective to run, to maintain, and to staff. Long-term planning and the distribution of funding will have to consider the implications of falling circulation figures and the change in balance between the more traditional library activities and the increasingly Web-based and ICT-driven services. Flexibility will be a requisite to cope with ever-changing user needs but, as the director of the Building Department at the University of Utrecht points out, "the meeting function, the preserving function, the studying function and the collaboration function will always remain" (Arets, 2005, p. 311). To that I might add the inspiration function and the connecting function. The move from collections in the traditional sense to connections in our multidisciplinary, collaborative, user-centered library world will continue to provide the challenge for the foreseeable future—and to ensure the provision of exciting, functional, beautiful, safe, and inspirational library buildings.

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