

## Online space displacing physical space in libraries; the impact of online use on the transformation of library design.

### Abstract

The basis of designing library spaces has been transformed. Initial views that online technologies would reduce the use of library space have not come to pass. The physical space remains important but much change has occurred. The focus has changed from an emphasis on housing of physical collections, accommodating staff and servicing users at desks, to highlighting the use of information technology in libraries and stressing user preferences for space utilisation. The pace and extent of the transformation have varied according to cultural values in various parts of the world and over time. From the east to the west, there have been significant differences. There have been varying interpretations of user behaviour and needs. Different approaches to the philosophical basis of librarianship have also affected the views of library space. Also of significance is the view of pedagogy taken in individual institutions and regions. Learner-based approaches, the increased availability of learning management systems tailored to individual use, the importance of group learning, and the growth of social networks have led to fundamental re-thinking of all spaces provided in libraries and learning institutions. The increasing use of mobile technology is causing further re-examination of space design. Common themes have developed which emphasize the need for flexibility, the importance of accommodating e-learning and m-learning, spaces for groups and areas for individual quiet study, and the emergence of self-service points, as well as those providing assistance. High tech still requires the high personal touch. The speakers will address the issues and highlight principles of library design, which should be followed, providing perspectives and examples from their Australian, Canadian, European and Turkish experience.

### Introduction

Changes in information technology have changed every facet of life and of library activities. In libraries, the real and the virtual have co-existed in varying ratios for several decades. Library design approaches have moved from accommodating the real to the virtual. "Readers" have become "viewers", "listeners" and "networkers". The collections range from "print" to "multimedia" and content initially provided locally on CD-ROM and other storage devices is now primarily accessed remotely. Early forecasts that the physical library would die have not come to fruition. Is change however now occurring? Is online space displacing physical space in libraries? If so, what is the evidence? What are the implications for library services, collections and facilities of increased online access? What is taking place in the online sphere and in the use of physical space? What kind of planning and preparation should libraries and architects undertake to future-proof their libraries?

Library design has involved the construction of new buildings and the refurbishment of old ones. The availability of capital funding for the construction or renovation of libraries varies tremendously across the world and over time. It has frequently been easier to obtain funds to build new libraries, grand in scale and conception, than to refurbish existing buildings. A culture of updating and refurbishment has not been always been present. Library buildings were built to last. In teaching and learning institutions, the construction of new libraries followed massive growth, particularly in higher education, spurred on by the presence of the large numbers of post war baby boomers and elsewhere by general population growth and urban changes. A culture of renovation nonetheless developed to accommodate new and emerging needs.

Product and process had dominated library space design. Spaces and collections were arranged according to library-generated rules, operational priorities and procedures. Little

attention was paid to “wayfinding” habits of users. Librarians were required to mediate, explain and teach users how to find the Library’s collections and facilities. With the arrival of the web and digital information, libraries began to implement new approaches to library space use. Computers and workstations were introduced in increasing numbers, together with wireless access by laptops and other mobile devices brought into libraries by their owners. Library design also accommodated computers for library processes such as lending. The positioning of inquiry points began to ensure that library users were able to gain help and assistance in using both the real and the virtual. Although print journals continued to be purchased alongside their electronic counterparts, the accommodation of ever-growing print collections as the primary motive became less significant. The library user also emerged as a focus. The huge growth in the use of the internet, the development of social networking, an enhanced understanding of library client behaviour, the emergence of mobile technologies and many other changes in teaching, learning and research required new design approaches. The costs of running libraries increased, for both salaries and the purchase of resources. Budgets did not grow to accommodate the increased costs and the economics of managing libraries also emerged as a force affecting library design. Rationalisation of branch libraries grew apace and in some parts of the world reduction in service points also followed with the introduction of increased self-service facilities. The new user focus saw libraries becoming exhibition spaces, including coffee shops and providing a variety of spaces for meeting, study and research. Pressures for change continue but the concept of “library as place” remains important across all types of libraries.

### **Cyberspace and physical space: will the twain ever meet?**

While the technological and economic changes were occurring, there was also a change in the culture of teaching, learning and research. The significant changes in teaching and learning range from the use of competency frameworks to interactive approaches with greater use of online learning and online learning management systems. Teachers moved from the delivery of lectures and the transmission of information and knowledge involving a comparatively passive student body to a student-centred approach, with learners taking an active part in their own learning. While these changes were slow, the increased emphasis on case studies, problem-based and resource-based learning, project work, group work, collaboration, lifelong learning, blended and hybrid learning, distance education and the acquisition of skills as well as knowledge, changed fundamentally the use of teaching facilities and libraries. Group work rather than individual study began to put unprecedented demands on the use of library and other learning spaces, and the use of information resources. The nature and methodology of research also changed as well as the topics examined. Interdisciplinary, transdisciplinary and multidisciplinary approaches are now common with increased opportunities for collaborative approaches. Libraries devoted to specific disciplines may no longer be relevant. All of these developments demand different approaches from information service providers with enhanced and increased access to information resources and “*just-in-time*” and “*just-for-you*” services being offered by libraries to their clients.

Claims that libraries will become obsolete now that all the information one needs is available on the net, free and easy to find and use, continue. ‘*Who needs physical libraries anymore?*’ is heard, especially when times are tough and competition for funds is fierce. Picon’s statement “An illusion must be first discarded: the notion that cyberspace entails the collapse of physical space..... this notion of a collapse of space caused by the development of telecommunication is one of the oldest myths of the industrial modernity” at the University and Cyberspace Conference elegantly sums up the naivety of some of the claims about the disappearance of libraries with the growth of online access to information (Picon, 2010).

Physical space can help make cyber life richer and more productive. Physical space can be designed as an extension of the virtual space and vice versa. If the two spaces are perceived

as complementary and interconnected, the design will bear this out and allow users of libraries to make the most of each seamlessly. The Information Commons concept when first introduced in libraries was conceived as “glorified computer labs” with rows of computers and related hardware and software, unwieldy chairs, and library and/or IT staff on duty to provide some help and assistance. Such facilities were usually open for longer hours. Today’s version is the Learning Commons and involves hybrid spaces facilitating communication and interactive group and individual activity. These spaces are conducive to learning, social networking, peer and project work and community activities, and often include food and drink facilities.

### **The users: who are they? What do they want?**

The term Millennial, Net or Digital Generation or Gen Y is often given to the group born between 1982 and 1991. Other terms used to describe younger library users are “netgeners” or the “Google” generation. A great deal of research exists about this generation, especially its use of time, technology, physical and cyberspace, attitudes towards learning and the workplace, and preferences and habits in communication. Millennials multi-task, constantly communicate, are globally and visually oriented and tend to have short attention spans.

According to Lippincott, this younger generation prefers (Lippincott, 2010):

- Doing academic work with or around their friends or classmates
- Making extensive use of technology and digital content
- Focusing on their academic work late at night and into early morning (could be anytime within a 24 hour period)
- Relating to one another mediated by digital technologies, social networking media
- Accessing and using information to create new knowledge and art forms
- Socialising and learning at the same time
- Blending formal and informal learning experiences

More mature users are also heavy users of the new technology and recent research is demonstrating that the differences between the young and the old are becoming less significant. Knowledge of the behaviour, habits and preferences of all users of library and learning spaces is essential when designing both physical and cyberspace. It is not uncommon for both librarians and space planners to make assumptions about the needs and wants of the users. “Don’t guess, just ask” should be the first principle of the learning and library space (both physical and cyber) design process. However, focus groups and user studies must formulate questions and state problems and issues in a purposeful way. The approach needs to be carefully planned, and progress and results communicated in such a way that users feel that their involvement and consultation are taken seriously.

There are many examples of user studies all around the world including OCLC’s studies and work by JISC in the United Kingdom, as well as individual studies in particular institutions. These all point to the emerging needs and ways of improving library services to meet those needs. The results of these studies emphasize the need for the library to advertise its brand and value, and to market its resources and services more effectively within the communities they serve. Libraries must provide seamless access to services and resources and be prepared for changing user behaviours.

Long term strategies are needed to cater for both the young and the old, who may be either clients or library staff. There are generation gaps and it is not uncommon to hear complaints about young people who make their presence known, e.g. too much noise, socialising and so on. Differing client demands present challenges and opportunities for librarians, architects, designers and facilities managers. There are also challenges for the maintenance of spaces and a continued match of the facilities with changing needs and use patterns. Future-

proofing of libraries and other learning spaces needs to be approached as part of strategic planning on an on-going basis, and not just as a one-off activity.

In research libraries, it is necessary to take into account the special needs, requirements and the changes taking place in the research sphere when planning library spaces. One recent study, NYU's 21st Century Library Project study, focused on faculty and graduate student needs for research and teaching. Three main themes emerged from the NYU study's conclusions (NYU, 2010):

*"1) unfettered, seamless, and comprehensive access to library collections and other research materials; 2) the importance of physical and virtual spaces for both contemplation and research; and 3) the role of the library as a gateway to the world's resources."*

The role of the library in providing an environment that inspires creativity and innovation in scholars across levels and disciplines appears to come through loud and clear in this and other studies. What is needed is:-:

- *Improving and expanding spaces for work*
- *Enabling collaboration and connections across disparate disciplines*
- *Making the discovery process more powerful*
- *Expanding beyond traditional conceptions of the library*
- *Creating more spaces and mechanisms for inspiration*

Variety is the spice of life and spaces provided must meet many needs - study, collaboration, innovation, interaction, discussion and networking, for individuals and groups, with or without computers and with or without coffee or food. Users want basic facilities with easy access to services and resources; they want access to the real and the virtual, with the virtual growing in importance. They want inspiration and fun, and they want pleasant and inviting surroundings and experiences in libraries. When asked, clients perceive libraries as pleasant relaxing places providing computers, with friendly people on hand to provide assistance in finding and using information. How are library and learning cyberspaces serving these needs? Are they designed well enough to offer these and other services for 7/24 access and use from anywhere? Are the staff sufficiently skilled and knowledgeable to interact with the students and researchers when they need help and support?

### **Use of spaces: physical and cyberspace**

All library physical space must be equipped to access cyberspace. Easy navigation without obstacles is required, e.g. power and cable connectivity. Too many clicks, too much intermediated activity, time spent physically going from one place to another will irritate the user. Increasingly, the front door of the Library is not the physical entrance but the home page of the Library's website. The design of websites must match the physical provision. Website design is challenging and many libraries employ professional web agencies and use sophisticated and expensive content management systems with an army of graphic designers and content creators to ensure their cyberspace is user friendly, easy to navigate and contains relevant and rich information to cater for all.. One of the world university ranking systems, Webometrics, uses university website performance (both formal and informal web-based scholarly communication) for ranking universities (<http://www.webometrics.info>) based on how rich university websites are.

It is well known both from previous studies (e.g. OCLC, Pew Research, JISC etc.) and from local research done at various universities that most people prefer Google as their first point of call to search and access information. The library catalogue often plays a minor role during the research process. Users undertake many activities in libraries using social networking media with smart hand-held devices, watching movies, listening to music or podcasts, reviewing resources available from a wide range of sites (including YouTube), chatting with friends, family, teaching staff, or even complete strangers using any number of media. Users

collaborate on projects, research problems, upload photos, videos, multimedia, create presentations individually or with others, use specialist tools e.g. Matlab, Mathematica, SPSS, Adobe software etc. They play games. Physical space design must accommodate this wide-ranging variety of uses.

### **The design process**

The Library space planning and design process too often begins with the wrong questions i.e. the number of books, computers, staff and users to be accommodated; the type and number of service points. It is still not uncommon to refer to some library standards (e.g. x number of square metres per student and so on), as it makes the task of calculating both the space required in terms of square metres and the cost of building it easier. Libraries should be designed to promote study and learning (Bennett, 2005). The changing focus from book repository and study hall to a client-based learning space is a relatively new approach, and still not acknowledged widely. Libraries are fundamentally about people – how they learn, how they use information and how they participate in the life of a community (Demas, 2005). Even though people spend a lot of time in cyberspace, they still keep coming back to physical libraries, using them for a wide variety of activities outlined above. Statistics demonstrate a growing use of libraries whether they be public or university libraries. Those libraries that have been renovated with the needs of the users in mind, and their input and collaboration, have led to increased use e.g. the renovated branch libraries at the University of Queensland, the newly created Multi-Media Learning Centre and the Main Library at Bond University and the renovated branch libraries at McGill University. Increased usage has come from accessible resources, a variety of spaces, new equipment, flexible and innovative facilities, as well as extended hours, and often 24/7. The collaboration and consultation process in space planning and design involving not only actual but also potential users prior to the building and renovation stages is critical for the success of new spaces.

All stakeholders must be involved and informed throughout the renovation and building stages. The final new space must not be launched as a complete surprise to its users. The users are and will remain the ultimate owners of the library and learning spaces. Web 2.0 social networking tools are increasingly used to engage students in space planning activities. For example at San Jose University, students representing a variety of groups on campus were invited to complete a learning spaces survey, which they undertook with a disposable camera to identify their favourite spaces. They then identified the least and most favourite campus places and interpreted peer responses resulting in a dialogue amongst the students and planners (Somerville & Collins, 2008). The outcome yielded the following student priorities:

- Open unconfined environment
- Comfortable, reconfigurable furniture
- Functional, inspiring space; and
- Ubiquitous mobile technology

The Library's location, entry/exit points must be central to the paths people take on their daily treks, for example be close to the cafeteria, dorms, bookshop, cafes, lecture theatres, academic buildings, sports complex. Library spaces situated away from people's daily paths may not be well used if special effort is required.

Some libraries are creating spaces for joint use with other functions. These include community services, an art gallery, student services, public exhibitions, IT Services and Help Desk, copying and printing, bookshop, teaching and learning support, classroom technologies, graduate student spaces, specialised data curation and use areas, writing centre, media production, research support, research centres and so on. For example, Bond University's Balnaves Multimedia Learning Centre managed by the Library has clusters of computer games areas and a multimedia classroom to cater for the computer games and film

and media studies programs. As spaces for printed collections contract, the areas vacated can be remodelled to house additional functions to create synergies with other service providers. and within the university. Co-location of university library spaces with research, learning or community service activities is similar to public libraries being located in shopping centres or busy urban areas.

### **A closer look at some academic libraries in Turkey, Australia and Canada**

In Turkey, libraries have been perceived and presented largely as study halls and book depots until recent times. Only a few have been paying attention to library design as part of the learning space design. Some of the academic libraries built in the last 20 years have been designed as iconic monuments to impress the community with their large atriums, huge circulation desks, multiple service points, grand entrances and impressive staircases, as showpieces. There are a few recent new university library buildings or renovations where associated areas including group study spaces, informal sitting lounges, 24/7 study areas, and coffee shops are attached to libraries and service points have been redesigned.

There is very little material published on library buildings and design in Turkey (Balanli et al, 2007). What is available focuses on standards, hygiene factors, library staff accommodation and regulations rather than on learning, service and community needs. A few of the private, not-for-profit institutions funded by private foundation income sources and tuition fees have in recent years begun to use customer satisfaction surveys to obtain feedback about the quality of services, resources and facilities. It is not clear whether the results of these surveys have contributed towards obtaining support for improvement of physical spaces.

Turkish universities like others elsewhere have been experiencing a great deal of change, with increased emphasis on research and internationalisation due to closer links not only through the EU, with some universities becoming part of the Bologna process and the Erasmus program, but also with the rest of the world. Increased emphasis on research and performance measures related to research and increased competition for better quality students especially in the private universities have helped some libraries to improve their resources and facilities. However, librarians often complain about the lack of consultation in space and technology projects. These projects tend to be engineering focused rather than service or user focused. The perception of the Library's role and the status of librarians no doubt contribute to this lack of consultation and involvement of librarians in the decision making process.

Ozyegin University, a new private university, was established in mid 2008 with the vision of being an innovative, technologically advanced, international, entrepreneurial and accessible university. The university has been operating at its interim campus for the last 3 years, whilst planning the new campus in the Asian part of Istanbul. A Princeton-based international architectural firm with extensive experience in university space design has designed the new campus master plan. The planning and design process took more than 2 years and the construction of the entire campus will take several years. The library space was conceived as part of the student centre building, similar to a village square which will also accommodate a forum, a restaurant, several coffee shops, bookshop, other commercial outlets, performance area, small fitness area outside the library, student services, counselling, career planning, and meeting rooms. The Rector (vice-chancellor) has been particularly interested in the design of learning spaces, including the library, to ensure students feel comfortable and at ease on campus and are able to exploit the facilities and the services available to achieve learning goals, emerging from their university experiences as well-rounded graduates in demand. A monument like a separate library building with thick walls, away from the centre of the campus was never part of the vision for the new campus. The needs, expectations, behaviour and attitudes of present day students to learning, technology, space use, socialisation, communication and information were taken into account right from the

beginning of the project. The building will have over four levels and a glass exterior. The Library Director was a member of the committee to select the architectural firm and was involved in the subsequent consultations to revise the plans and during the implementation. The new campus will begin to be used from 2011-2012.

Australian academic libraries have seen the construction of some new library buildings, the development of joint stores for the accommodation of collections, the amalgamation of branch libraries and the refurbishment of library spaces. In general, funds have been provided from capital sources within the Federal funding regime, from local budget allocation and from funds available through donations. The University of New South Wales has seen the construction of a new Law Library. The University of Sydney has amalgamated small science libraries to provide a fresh new space, which meets the needs of cyberspace, and physical space. It is also planning a refurbishment of its iconic building, the Fisher Library. User needs are being brought to bear in an effort to combine cyberspace and physical space. LaTrobe University has recently "re-opened" its library with a new entrance and installed a new learning space. Most Australian academic libraries have plans to refurbish spaces, or have recently done so.

The University of Queensland Library experience has been typical of many Australian libraries. The refurbishment began with a new name for the Library – the Cybrary, a linguistic device for forcing a re-think of library service provision and of library space design in the cyberspace. An excellent collaboration between the Cybrary, the Wilson firm of architects and the University's Property and Facilities Division ensured the refurbishment and construction of 13 branch libraries over a period of 10 years. New libraries were constructed at the Princess Alexandra Hospital, the Mater Hospital and Ipswich Campus Libraries. More recently, an excellent new pharmacy library has been created within the PACE (Pharmacy Australia Centre of Excellence). Initially, the University's Undergraduate and Central Libraries were combined to form the Social Sciences and Humanities Library. The Biological Sciences Library was extended and enhanced to provide interactive learning spaces and e-learning centres. Planning focused on the need to include easy real help and assistance, self-service facilities and a search for models of design on similar services like video stores. User behaviour was tracked to ensure it was understood and the design was focused on the behaviours observed. The Ipswich campus positioned the Library with student services on the campus and artfully separated computer study spaces and seating from the books with a water feature i.e. a stream including goldfish. The design focused on behaviour where some users wanted interaction and others did not. Group study rooms, cafe booths for informal group work, casual comfortable seating, a coffee shop, and interactive spaces were all featured in the various facilities, as well as exhibition space. A new page in library design was turned.

In Canada, the prime funding sources of Canadian universities are the provincial (state) governments. Federal funds are available through various authorities for research, and some of the research funding can be used for infrastructure and new building construction, including libraries. For the most part, academic libraries must rely on internal funds, specially targeted provincial funds or donor funds for substantial work on new library buildings or renovation projects. There have been various successes with obtaining funds for significant projects in recent years. The University of British Columbia in Vancouver has undertaken the construction of the impressive Irving K. Barber Learning Centre/Main Library with its automated storage and retrieval centre operated by a robot and a specially designed Chapman Learning Centre. Queen's University in Kingston, Ontario, has a new library building which paid close attention to wayfinding in its design and layout. The Joseph T. Stauffer Library featuring an atrium approach includes the Queen's Learning Commons and an Adaptive Technology Centre. It is a collaborative endeavour with the Library, Learning Strategies Development, Special Readers' Services, the Writing Centre and IT Services to provide students with a technology-enriched learning environment. Workshops and

consultations on study skills, coaching and referral for academic success and course-specific study sessions are provided. Ryerson University in downtown Toronto is building a 21<sup>st</sup> - century library building. In announcing the new development, the University's President said that the new Student learning Centre would provide an outstanding environment to study and collaborate, to spark interaction and discovery and be accessible, comfortable, digitally connected and ready to adapt to new technologies, developments and services. The "grand dame" of academic libraries in Canada, the University of Toronto, is planning a significant upgrade of the brutalist features of its Robarts Library and an upgrade to service provision. Thousands of new study spaces will be provided and a new outdoor amphitheatre-like area with glass enclosed study spaces and a new entrance. The Université de Laval located in Quebec City is planning a 21<sup>st</sup> century library refurbishment, seeking to create a better synergy between its collections and its users.

McGill University Library exhibited the features of many libraries in North America. Little had been done to accommodate new cyberspace approaches but in 2005, with the arrival of an antipodean new Director of Libraries, plans were put in place to use any available funds to upgrade the Library's services, and its facilities to accommodate new technology, new learning behaviours and new client-focused service approaches. Concept briefs were prepared for each of the 13 branch libraries and gradually facilities were upgraded. A new Music Library was included in the new Music Building opened in 2005. Upgrades of most branch libraries were secured with the support of the Deans and the Provost. A new much-admired Cyberthèque was constructed in the Humanities and Social Sciences Library. It included four glass study pods equipped with group study opportunities and a large screen for collaborative activity. Booths or banquettes were also placed in the space for informal group study. Quiet spaces for individual study were installed on one side of the space, providing the segregated spaces required to support group and individual study. A large training room was provided with small tables and laptops so that they could be re-arranged for interactive learning opportunities. Four large screens in the room also facilitated interactive access. Seating was maximized with the use of long desks, with the provision of hard-wired computers provided at 50% of the seating available, with assumed laptop use at the other 50%. The Library lent laptops for this purpose, or alternatively students could provide their own. High benches were installed following models observed in the various Apple stores, and casual seating on colourful ottomans was provided. Other branch libraries at McGill, including the Education Library and Curriculum Resources Centre, the Schulich Library of Science and Engineering, and the Macdonald Campus Library have seen significant renovation to ensure alignment with the Library's vision of focusing on Information, Innovation and Service. Key to the new approach was student funding and student involvement in planning of the new services being provided, and a committed interior design firm.

## **Conclusion**

Library space design has changed fundamentally in most parts of the world with the impact of new information technology on libraries; the growth of the internet; the impact of Google, the changed behaviour of information users and library clients; economic and financial pressures, the need for sustainability, altered research priorities, the development of multidisciplinary approaches; new methods of teaching and learning; social networking; the need for collaborative activity; new ways of working; globalization; and mobility of users. Are the changes transformational? Is cyberspace being successfully integrated into the physical spaces within libraries? In some parts of the world, the "edifice" complex is still paramount and the construction of library buildings featuring Roman columns, book shapes, and knowledge symbols still abound. The "form follows function" approach emphasizes that library buildings must follow the functions they perform. What may be in question in the twenty first century is what are the functions of libraries and how are they translated into building design. The Library continues to collect and provide access to information resources; it organizes information and makes it available for use; and it provides services to



users. However, the Library is a growing organism. The design of the Library's online services and the design of its physical space must be effectively integrated to provide services to users, which optimize the availability of information in the twenty-first century. The front door home page of the Library's website and the front door of the physical library must be equally easily located, entered and used effectively. The library design showcase for 2010 in *American Libraries* lists ten specific facets of library design. They are: building community, green libraries, historic style, biblio-techs, libraries in harmony, themes and styles, learning spaces, let there be light, special features and libraries at night. Perhaps all is alive and well in library design land – online use is transforming library design but there is a plurality of approaches and a healthy examination of all the aspects associated with the functioning of a library.

## References:

ACRL Research Planning and Review Committee (2010) 2010 top ten trends in academic libraries: a review of the current literature. *C&RL News* June 2010, 286-292.

<http://crln.acrl.org/content/71/6/286.long> (accessed 24 August 2010)

Balanli, A., Ozturk, A., Vural, S.M. and Kucukcan, B (2007) University library buildings in Turkey: a survey and a case study of Yildiz Technical University Main Library Building. *The Journal of Academic Librarianship*, 33(6), 714-718.

Bennett, Scott (2005) Righting the balance. In *Library as Place: Rethinking Roles, Rethinking Space*. Washington D.C. CLIR.

<http://www.clir.org/pubs/reports/pub129/pub129.pdf> (accessed 5 September 2010)

Brown, William M. (2008) Future-proof design. *Library Journal*, Fall 2008 *Library By Design*, p.1-10

Demas, S (2005) From the ashes of Alexandria: what's happening in the college library. Washington D.C. CLIR. <http://www.clir.org/pubs/reports/pub129/pub129.pdf> (accessed 5 September 2010)

Dewe, M. (ed.) (2009) *Renewing our libraries; case studies in re-planning and refurbishment*. Burlington, Vt.: Ashgate Publishing Company.

The digital information seeker: report from selected OCLC, RIN and JISC user behaviour projects.

<http://www.jisc.ac.uk/media/documents/publications/reports/2010/digitalinformationseekerreport.pdf>. (accessed 16th August, 2010)

Huntley, S., and Schaller, M. (2009) Assessment: the key to creating spaces that promote learning. *Educause Review* 44 (2) 26-34.

Khan, A. (2009) *Better by design: an introduction to planning and designing a new library building*. London: Facet publishing.

Library design showcase. 2010. <http://americanlibrariesmagazine.org/librarydesign10>. (accessed 25 October, 2010)

Lippincott, Joan K. (2010) Information Commons: meeting Millennials' needs. *Journal of Library Administration*, 50 (1), January 2010. <http://www.cni.org/staff/joanpubs/IC.jlibadmin.lippincott.preprint.pdf> (accessed 12 September 2010)

Niegaard, H., Lauridsen, J. And Schulz, K. (eds). (2009) *Library space: inspiration for buildings and design*. Copenhagen: Danish Library Association.

NYU 21st Century Library Project: Designing a Research Library of the Future for New York University Report of a Study of Faculty and Graduate Student Needs for Research and Teaching (2007) Conducted by New York University Libraries with the assistance of Katzenbach Partners LLC (KPL) Report prepared by Cecily Marcus, Lucinda Covert-Vail and Carol A. Mandel based on the research and recommendations of the Study Team and KPL <http://library.nyu.edu/about/KPLReport.pdf> (accessed 15 September 2010)

OCLC (2005) "Perceptions of Libraries and Information Resources" available at [http://www.oclc.org/reports/pdfs/Percept\\_all.pdf](http://www.oclc.org/reports/pdfs/Percept_all.pdf) (accessed 23 July 2010)

Picon, Antoine (2010) Academic spaces in the age of cyberspace: prospective remarks. University and Cyberspace Conference, Politecnico di Torino 28-30 June 2010. [http://www.communia-project.eu/communiafiles/conf2010/conf2010n\\_Picon.pdf](http://www.communia-project.eu/communiafiles/conf2010/conf2010n_Picon.pdf) (accessed 7 August 2010)

Schmidt, J. (2007) Unlocking the library: library design from a marketing perspective in K. Latimer and H. Niegaard (eds). *IFLA library building guidelines: developments and reflections*. Munchen: K.G. Saur. Pp.55-67

Schmidt, J. and H. Wilson. Designing the real virtual library: an overview of the preparation of an upgrade for the University of Queensland Library [http://www.library.uq.edu.au/papers/paperarchives/designing\\_the\\_real\\_virtual\\_library.pdf](http://www.library.uq.edu.au/papers/paperarchives/designing_the_real_virtual_library.pdf). (accessed 25 October, 2010)

Somerville, M.M. & Collins, L. (2008) Collaborative design: a learner-centered library planning approach. *The Electronic Library* Vol. 26(6), 803-820.

Tapscott, D. (2009) *Growing up digital*. Toronto, McGraw-Hill.