Architectural and Design Elements of Today’s Public Library Buildings

By
Vera Fijan
S2733625

Supervisor: Dr John Flood
27 June 2016
Word count: 15257

Master’s Dissertation Literary Studies.
Programme: Writing, Editing and Mediating.
University of Groningen
Abstract

This dissertation focuses on some of the main changes in public library design, as a result of the changing role of these institutions in today’s society. For many years public libraries were the places where people would go to have access to information and books. However, the fast development of digital technologies and electronic information services led to several changes in the way public libraries provide information. Consequently, as libraries offer a much wider variety of services and materials, library buildings had to be adapted in order to give response to patrons’ needs.

Today, public libraries are dynamic places that encourage patrons to interact and communicate. Nevertheless, designing a new building, or remodelling an existent one is an expensive project, therefore, a careful plan is fundamental to ensure a creative and interactive building is created. A wise use of space, a good lighting and acoustic designs, and wide open areas that encourage group work should be some of the main characteristics of today’s library buildings. A functional building should encourage patrons to use the different spaces and make use of the different materials and collections available.
# Table of Contents

List of Figures .................................................. 4  
Introduction .................................................... 5  
  1. Chapter One: Use of Space .................................. 9  
  2. Chapter Two: Acoustic Design .............................. 30  
  3. Chapter Three: Lighting Design ........................... 40  
  4. Chapter Four: Security in Public Libraries ............... 58  
Conclusion ...................................................... 66  
Works Cited .................................................... 71
List of Figures:

Figure 1: New York Public Library: Children’s centre 17
Figure 2: New York Public Library: Gift shop 18
Figure 3: New York Public Library Study room 18
Figure 4: New York Public Library: Rose Main Reading Room 19
Figure 5: New York Public Library: Main building’s entrance 20
Figure 6: Columbus Metropolitan Library: Main building exterior and park 22
Figure 7: Columbus Metropolitan Library: Main reading room 23
Figure 8: Amsterdam Central Library: Magazine and newspaper’s area 26
Figure 9: Amsterdam Central Library: Individual study places 26
Figure 10: Amsterdam Central Library: Multimedia floor 27
Figure 11: Amsterdam Central Library: Cafeteria 27
Figure 12: Amsterdam Central Library: Children’s area 28
Figure 13: New York Public Library: Main building lit at night 49
Figure 14: New York Public Library: Floor lamps in the main entrance 50
Figure 15: New York Public Library: Suspended chandelier of the reading room 51
Figure 16: New York Public Library: Book stacks lighting of the reading room 52
Figure 17: Amsterdam Central Library: Exterior of the main building 54
Figure 18: Amsterdam Central Library: The illuminated escalator 55
Figure 19: Amsterdam Central Library: Magazines with an attractive lighting 56
Introduction

Traditionally, public libraries represented wealth, a sign of civilization, public expression and the civic pride of the city where they were located. Therefore, for many years these institutions were considered “people’s universities”, where adults and students could access books, information and extend their studies (Abell and Carnegie 246). However, during the last years, the information-seeking behaviour of libraries’ customers and the development of information technologies, mainly the internet, have affected the way libraries provide information. Patrons, aware of the technologies available, have high expectations of libraries’ services and want information and materials to be delivered instantly. Therefore, librarians are also aware of the challenging period public libraries are facing, and the importance of a creative and innovative transformation in these institutions (Heron and Mathews xi).

Much has been written on the future of libraries, as well as different strategies these institutions may adopt in order to secure their future. Nevertheless, some scholars share the opinion that the obsolescence of public libraries, as physical spaces, is a realistic and possible perspective. They believe that due to the use of the internet and other electronic information systems the public library will become a digital space where patrons can have access to information more quickly and easily (McDonald 2). Other scholars, however, believe that in the future the public library will become a “hybrid” institution that offers both digital and print collections and materials (Abell and Carnegie 249). While thinking about this controversial issue, the “obsolescence of public libraries”, several question came to my mind. How are recently built public libraries being differently planned and designed, or how can old library buildings be adapted to the current needs of patrons? What are the most important elements to consider when
planning a new building or renovating an existing one? To find an answer to these
questions this dissertation focuses on some major design and architectural elements in
three public libraries that have recently been built or renovated.

Today, public libraries face a particularly challenging and uncertain future. The
idea of the library as a silent space and a “book storehouse” is quite outdated, as
nowadays these institutions offer not only materials in different formats, but are also
committed to interact and work more closely with customers. Furthermore, as libraries
offer information in different formats, institutions also need to provide the suitable
equipment, for instance computers, able to reproduce the wide range of materials and
collections available in the library. However, while libraries are trying to keep their
responsibility of providing and collecting material a tendency to commercialize
information has been growing. Most of the valuable information comes from universities
and other non-commercial organizations, as well as publishers and electronic journals
that due to the easy access and availability of information may require a subscription to
access their materials. Yet, some commercial organizations are eager to create more
opportunities for e-commerce and advertisements. As a result, some of this information
may be less reliable as it is motivated by the interests of a certain supplier, most of the
times for monetary or ideological advantages (Black and Hoare 649). Thus, the provision
of information has become a complex process and the function of libraries and librarians
in the Information Society is still not a certain one (652).

When planning a new library building or a renovation plan, architects and library
employees should work closely to ensure the building is aesthetically pleasant, able to
satisfy patrons’ needs, and that space is used wisely. Yet, new library buildings or
remodelling a public library requires a big investment, therefore, the library should be
planned or remodelled wisely. I will argue that the architects and designers involved in the project should bear in mind that an effective library building should meet a number of qualities, such as being functional, accessible, adaptable and interactive. Innovative and exciting architectural features should be combined with a balanced use of space for collections, different services and technology. Also, it is fundamental that the different services and spaces of the library are able to attract patrons that do not need to visit the library to borrow a book, or other materials, now available electronically. Furthermore, public library buildings should be able to promote interaction between patrons and encourage the use of the different materials and spaces available in the building. In this regard, group study areas, social spaces and cafeterias, as well as creative children’s areas are some of the new spaces of public library buildings. Ideally, a functional library building combines collaborative and interactive learning spaces, with the traditional quiet and silent reading rooms. In addition, much attention has been given to daylight, cultural artwork, security, noise management, natural ventilation, information skills training and provision for e-materials (McDonald 1).

I noticed the current tendency of most library buildings to opt for wide, open and clear areas. Based on this trend, I selected four major design elements of today’s library buildings: the use of space, acoustics, lighting, and security, each one representing a chapter. I will argue that the existence of different spaces in the library are fundamental to design a functional and attractive building. Furthermore, I will demonstrate that the successful design of these areas is only possible when combined with an effective acoustic, lighting and security design that enable the architects to create different atmospheres, but also a stable environment in the building. Moreover, three public libraries were selected as case studies: the New York Public Library (NYPL), the Columbus Metropolitan Library (CML), in Ohio, and the Amsterdam Central Library
(OBA). The NYPL, constructed in 1911, was chosen not only for being a widely visited library, but also for housing the most used collection of any public library in the United States (Platt 247). The CML’s main building was built in 1907 and is currently closed for renovations. The institution was also selected due to the renovation plan that intends to adapt an old building to the current needs of patrons. Finally, the OBA, built in 2007, was included because of its modern and innovative design, as well as for being a building that was planned already focusing the current needs of patrons, but also because I considered to be important to include a building I could visit.

By adding a final section with three case studies to each chapter this dissertation aims to investigate the architectural and design solutions used in different institutions. On this account, this dissertation has both a theoretical and a practical component. Each chapter focuses an important element of today’s library buildings, explaining not only what are the important things to consider when planning the building’s lighting, for instance, but also offering different solutions. I believe the combination of an “informative chapter” followed by a practical section, is an effective way to demonstrate how public libraries apply the design solutions mentioned throughout each chapter. Nevertheless, not all the chapters include a section with the three case studies, for in some cases there was no relevant or valuable information to mention.
Chapter One: Use of Space

For many years the library was a place of silence and study, where children were not allowed. In the United States of America, during the late eighteen century, the famous library buildings financed by Andrew Carnegie were considered a successful model and included: a repository for the books, a reference room, and a reading room. The repository for the books had multiple metal book stacks, normally not open to the public. The reference room housed the reference books, especially the large sets of books, but provided limited seating for the reader. The reading room was the place in the library where patrons could sit and read the materials retrieved from the stacks, reference material in the room and their own book, or other reading materials. Inspired by grand staircases of palaces, cathedrals and other buildings, some libraries had imposing entrances. However, during the nineteen-thirties most of the libraries with this sort of entrances where remodelled to give response to the increasing traffic flow and circulation. As libraries were committed to be accessible and open institutions it also became clear that the library building would have to more functional and include other services and spaces (Bisbrouck et al. 14).

Today, due to the information that patrons can easily access digitally, most of the times on the internet, it has become difficult for librarians to decide and determine what type of materials to preserve in libraries, but also what kind of spaces and services are attractive for patrons that do not need to visit the library to borrow a book. The following chapter will demonstrate how different spaces have different functions in the library. I will defend that children’s areas and loud rooms have in recent years become important spaces of public libraries, as well as how they contribute to create an attractive library building.
In the United States of America, the first children’s areas were built in public libraries’ basements, normally a small and limited space for children. Preschool and kindergarten services begun in the nineteen-fifties, and since the nineteen-eighties libraries have been promoting the crucial role that parents and caregivers play in helping children gain literacy skills (Feinberg and Keller X). As a result, in recent years, creating library spaces for babies, toddlers and school-age children through about twelve-years has been a major concern (Brown 109). Yet, designing a children’s area requires careful study and planning. The first contact children have with libraries occurs, most of the times, in the children’s area, and will influence to a big extent their relation and behaviour towards public libraries as adults. Therefore, it is important that libraries create attractive spaces that successfully engage with children, this includes a careful selection of books and materials, but of furniture, colours, shelving and lighting as well.

While planning the children’s area it is important to study the local community, and know the children’s age group that mostly visits the library, for instance infants or elementary-school children, as they require different sort of spaces, materials and activities. For example, storytelling may be something that entertains toddlers, but does not challenge and interests older children anymore. The need of visual control has influenced the design of small and medium sized public libraries with limited staff, as parents feel more comfortable if they are able to see their children playing and walking along the book stacks. In this regard, low book stacks are the best option, as they facilitate visual control, but are also more attractive for children, who can reach the top shelves more easily. Glass walls are also preferable, as it allows parents and staff to see children and other people inside the room from the outside (Brown 3).
Deciding where to place the children’s area is a difficult task. On the one hand, it is important that children can see an obvious welcoming sign and recognize their area when entering the building; on the other hand, it should not be too close to the main entrance, for in the periods libraries get busier some children may be able to leave their area and the library unnoticed. Some libraries opt to have staff in the children’s area that also control the entrance and exist of the room, even though most parents opt to stay with their children. It is also essential that children’s areas have appealing seating for parents and caregivers to comfortably wait while their children participate in the library’s activities, or play with other children. Also, while some parents prefer to use this time to visit the adult’s area, others like to socialize and talk with other parents, for this reason comfortable seats are fundamental, as standing in the hall or waiting in the reading room is not ideal.

Children’s areas are commonly designed with three-dimensional artwork, and decorative elements, often based on a theme (110). However, librarians and designers should plan these decorative elements carefully and in such a way that it is both easy and inexpensive to change them from time to time, as theme-based decorative elements may become outdated. An effective solution to avoid changing and updating decorative elements too often is to opt for themes that most children like, such as animals, and famous book characters, but this will also depend on the funding available for the project. It is important to keep in mind that book characters are protected by copyright, therefore, it will be necessary to obtain permission to use them in the library’s design, and may include a certain fee. An alternative is that the library opts to create and use characters and designs of their own, which can result in an original and creative space.
Open and unobstructed spaces are essential for children to feel comfortable with the space and arrangement of the room. The design of the room should not include objects that are not meant for children to touch or use, or that children have to be protected from using. Although designers and architects have opted several times to create platforms, spaces that are designed uniquely with a flat floor are the best for safety and access. Areas containing structures that involve climbing, jumping and running should be closely monitored, and are not recommended in areas meant for toddlers and babies, as this may create dangerous situations, and changes in floor are not practical for parents with babies in strollers. The furniture is also an important aspect in children’s spaces, as well as creating distinct places for each age group, where different sort of activities take place. Chairs with a seat height of 12in (30.50cm) should be provided for preschool children, whereas chairs with a height of 16in (40.65cm) and tables with a height between 25in and 27in (63.50cm and 68.60cm) should be provided for school-age children (112). The furniture material should be comfortable, durable, safe and appealing. Also, reading tables should preferably be round, for tables without corners are safer and encourage reading and group work. Teenagers should also have their own space, with adult-height furniture, where they can sit and read, or even do their homework with their parents or caregivers. These spaces have also been a main concern for librarians who believe that teenagers should also be able to find an appealing space in the library. Depending on the local community, some teenagers will see the library as the place where they can find a quiet, safe and comfortable space to study, do their homework or access the internet (115).

The easy and fast access to information and the increasing use of e-books have influenced the role of public libraries as social spaces. Today, libraries need to create spaces that are attractive for customers that do not need to visit the library to borrow a
book or other materials, now available electronically. As a result, together with children’s areas, over the last years, public libraries have also put much focus in creating more open areas, loud rooms, as well as activities that encourage patrons’ interaction and communication. Thus, today, looking for a book is only one of the several things patrons can expect to do in the library. Consequently, customers are also using libraries differently, meaning that the classic model of the library as a building where silence and quietness were a main characteristic is outdated. Public libraries encourage customers to interact, participate in activities, and make use of the library as a public building, open to everyone and not exclusively for people looking for a quiet place to study or a specific book (Audunson, Svanhild and Vårheim 4). Thus, the library has become an important space where people with different backgrounds interact and get in contact with the same purpose of learning.

During a visit to the main building of the Public Library of Rotterdam, in February 2016, in the entrance hall a large chess set, surrounded by chairs, was attracting patrons’ attention, encouraging them to play with each other, and others to watch. This is an example of an effective strategy to stimulate patrons to do something together. Creating these social spaces in the entrance hall is an effective way to encourage patrons to stay longer in the library, to look and explore for different activities that may be happening or going to take place in the library. These multipurpose areas are attractive for elderly who see the library as an alternative to staying home alone, students looking for company to study, or people looking for a comfortable place to meet and sit with a friend. In other words, it is a place designed for patrons, who are free to use it for multiple reasons and purposes. Even if patrons do not talk to other customers during their visit to the library, the feeling of community will probably still be strong, resulting in a sense of belonging, and patrons wanting to come back to the library (Goulding qtd. in Audunson,
Svanhild and Vårheim). However, these areas also need to be carefully planned. The seating places are an important choice, and essential in making the space attractive. Ideally, both individual and group seats are available. It is important that individual seats have some distance between them, for people tend to leave a seat empty when chairs are placed side by side. A good option is to create a space with individual arm chairs for people who want to read or work alone. An area with tables is also indispensable, for students, or even people who like to work in the library. A space for group meetings with sofas and easily transportable individual chairs will also be important. Most of the libraries have a cafeteria or restaurant placed in these social areas, which is also a good alternative for people using the reading room and who wish to have a break for coffee, for it avoids having to leave the building and look for other facilities.

Joan Fry Williams, librarian and library consultant, compares the social spaces in the library to a kitchen: a grocery store is where people go to consume; the kitchen, however, is the place where ingredients are combined, with skill, and talent to cook a meal. Kitchens tend to be social places, where everyone ends up at a party, because it is the place where action is taking place. Fry Williams claims that libraries should also be like kitchens, “active social places where you mix a rich set of ingredients (information, resources, talents) into an exciting new concoction that can then be shared” (Fry Williams qtd. in Lankes 47).

**New York Public Library**

The New York Public Library (NYPL) has since its early years become an iconic symbol of New York City, and one of the biggest library systems of the United States of America. The library has become an important symbol not only for the imposing architecture of
the exterior of the building, but also for the main reading room, on the third floor. Since its opening, in 1911, the institution has been committed to “providing free and equal access to its resources and facilities” and in developing the most rapid delivery system (NYPL About par.3). Today the library is visited by millions of people, not only patrons looking for a book or a place to study, but tourists as well. In recent years, in order to meet customers’ expectations and needs, the institution has been renovating several of its eighty-eight branches, providing it with technological devices, and more spaces for patrons. The main building, the Schwarzman Building, of three floors includes a children’s area, exhibition halls, a cafeteria, private study rooms and the iconic reading room. Free guided tours are also available for groups (NYPL Stephen par.4)

In 2008 the main building reopened the children’s area, for many years only available in other branches of the library. The children’s area, in Figure 1, located on the ground floor, offers a wide collection of books, CDs, DVDs, a computer area reserved for children and TV screens with gaming equipment. The children’s services organize several events, such as storytelling, musical and theatrical performances, as well as authors and illustrators visits. This area is mainly designed for children from infancy to the age of twelve, accompanied by parents or caregivers (NYPL, Children’s par.3). The location of the area, on the ground floor, is the best solution for parents with younger children, but also a good strategy to avoid the great number of visitors of the main reading room.

Conferences, exhibitions, lectures and workshops take place very often at the main building, in the galleries and auditoriums. Considering the importance of the main building as a tourist attraction a gift shop, Figure 2, where visitors can purchase different sorts of souvenirs is also available. The Rose Main Reading Room, in Figure 4, is currently closed for renovations, but the institution provides other rooms and spaces that
patrons can use for studying, reading or connecting to the internet. The Berger Forum and the Salomon Room, on the second and third floors respectively, have unrestricted access for general library use, such as reading or studying. Two research rooms are reserved for writers and researchers who use the Schwarzman Building daily, so that they have their own space that allows for book delivery, work with materials and have a quieter place and environment. In the Mixed-Use rooms the library provides seating for researchers accessing items from the library’s collections. The library also keeps three rooms exclusively reserved for scholars and writers who are working on specific long-term projects (NYPL Where to par.3). The different spaces in the library reflect the importance of the library as an institution that assists different age groups, and patrons with different needs, but of a research institution that houses valuable and rich collections in the humanities and social sciences, as well.

Over the last years the institution has been in the spotlight for its former renovation plan, known as Central Library Plan (CLP) that became quite controversial as many scholars, writers, public figures and patrons were against it. The CLP intended to move three million books to a storage facility in Princeton, New Jersey. The seven floors of the library’s underground stacks would be transformed into a reader-friendly circulating library, with computers, other electronic devices, and public rooms where customers could meet and have coffee. Public outreach, rather than specialized research would be dominant (Dirda par. 2). Yet, several patrons and scholars disapproved the idea of losing the emblematic reading room, as a result the institution decided to abandon the CLP. After the reopening of the Rose Main Reading Room the institution intends to maintain the room with unrestricted access and a place where people can connect to the internet, read the library’s or their own materials, or just visit and have a place to sit. The
reading room has forty-two oak tables, a total of six hundred and twenty four seats, and is almost as big as a football field (NYPL Stephen A. par.7)
Figure 2: New York Public Library: Gift shop (TimeOut)

Figure 3: New York Public Library: Study Room (Day)
Figure 4: New York Public Library: Rose Main Reading Room (Ong)
Figure 5: New York Public Library: Main building’s entrance (Ong)
Columbus Metropolitan Library

The Columbus Metropolitan Library (CML) is currently renovating nine of its branches, including the main building, providing them with more space for patrons and technological devices; the emphasis is in “creating large, open multipurpose areas and “aesthetically pleasing, human friendly environments” (Conner). Some of the measures taken to increase the sense of openness and clarity are the use of glass walls and lower book stacks. The book stacks in the renovated branches are mostly between 60in and 66in (1.52m and 1.65m) (Hatcher). Staff areas will also be smaller in order to gain more space for patrons and the library itself (Gilchrist par. 6).

The entrance hall of the main building, will be an ample space, with a glass wall facing the park behind the library, and comfortable seating where patrons can meet a friend, and interact with other customers. The children’s area will remain on the first floor, next to the Homework Center, but more open to the main atrium. Furthermore, a teenager’s area will also be available on the second floor. The second and third floors will have a view over the main atrium and seating areas will be provided around the railings. The reading room, in Figure 7, will be a wide open area, with glass walls and different types of seating. Patrons can make use of this space not only to read the library’s materials, but their own book, magazine or work on their computer as well. The institution also hopes to use the reading room to host conferences and other activities (par. 15). Moreover, the main building will be connected to the Topiary Park, behind the library, providing outdoors reading places.

The CML has developed several programs to give response to the needs of the younger generations of the community. All of the library's branches have a homework centre meant for children who need a place or help to do their homework after school.
These centres offer computers, printers, and other resources, as well as staff members trained to help children with their homework. The institution has also implemented a reading program that has become very successful: the “reading buddies”. This is a program available in all of the library’s branches that consists of a fifteen-minute session where a volunteer or a staff member will sit with a child to read a book. The CML also provides several services for adults, such as job centres and staff to help homeless to get medical assistance (Briner par.6). The different spaces of the CML prove the commitment of the institution to assist the community with different services, but spaces for the different age groups, as well.

Figure 6: Columbus Metropolitan Library: Main building exterior and park (Columbus Metropolitan Library)
Figure 7: Columbus Metropolitan Library: Main reading room (Schooley Caldwell)
Amsterdam Central Library

The Amsterdam Central Library (in Dutch Openbare Bibliotheek Amsterdam or simply OBA) open since 2007, was designed by the Dutch firm Jo Coenen & Co. Architekten. Contrarily to the NYPL and the CML, the OBA’s original plan already had as main concern the creation of wide open spaces, as well as different attractive areas with comfortable seating meant for patrons’ interaction or customers looking for a comfortable place to work or read. The main idea was to create a library that people go for books, but also a space where people feel comfortable and want to go back to, feel encouraged to learn, interact with other people and participate in different sort of activities. Creating light and different comfortable areas was a major concern of the architects, and are main features of the building. Spread over ten floors, the library has a cafeteria, a multimedia floor, a theatre, a terrace and an exhibition hall.

The ground floor of the library is an ample space with several computers with access to the internet, comfortable seating and tables; newspapers and magazines are also available. This is an important space, for the city has are several students looking for a comfortable place to study. Also, the library is very close to the main train station of Amsterdam, and has become a tourist attraction due to its innovative a modern design. It is also worth noting that the OBA has received very good reviews in several non-Dutch travel blogs and websites, owing to the library’s various attractive, creative and comfortable spaces.

The children’s area, at the lowest floor, is also a very open and wide space with attractive and creative book stacks. The area, in figure 12, is accessed from the entrance through a stair case, with low and wide steps, which makes it easier for children to walk up and down. The book stacks are round, creating little spaces and islands for children
to explore and get inside. The interior of some book stacks have a screen and comfortable seats for children to watch a film, others have a staircase leading to platforms where children can sit and read a book. These, however, can become dangerous for younger children, as the size of the stair cases do not allow parents to accompany their children. The children’s area also have comfortable seating for parents to sit while they wait, or read with their children. The first floor of the library is a multimedia area, with CDs, DVDs and several computers. This is also a very innovative space, as the classic “computer, table, and chair” were replaced by modern, comfortable and low seats placed in front of a simple structure with a screen and the computer’s keyboard, shown in figure 10.

The library offers several work places, such as long tables meant for people who want to study or work alone, and tables of four or six places, for groups that want to work together. Carrels are also available for people that prefer to have a certain privacy. The openness of the building creates a comfortable environment, and influences people to interact without feeling they are disturbing other patrons. The OBA is a building where people can find a comfortable place to study, have coffee with a friend, access the internet, attend conferences and concerts, or participate in the several workshops offered by the library. It is, therefore, an example of a building that has really become the “public building” where people can go for several reasons.
Figure 8: Amsterdam Central Library: Magazine and newspaper’s area (ANP)

Figure 9: Amsterdam Central Library: Individual study places (Krish)
Figure 10: Amsterdam Central Library: Multimedia floor (An Internship With BSF)

Figure 11: Amsterdam Central Library: Cafeteria (Van Der Star)
Figure 12: Amsterdam Central Library: Children’s area (OppasStudent)
In summary, on the one hand, as libraries have been focused in children’s and teenagers’ areas, libraries become more attractive for families; on the other, the open and social spaces that are now part of libraries also create a propitious environment for interaction between patrons, which leads to a sense of belonging and patrons wanting to go back to the library. I have shown the importance of libraries to create alternative and interactive places that are still attractive for patrons that do not need to visit the library building to borrow a book or other materials. Moreover, this is an important turning point in library buildings that for years tried to provide a proper study environment of silence and quietness, and are now trying to create more social, open spaces for patrons. Undoubtedly, public libraries are focused in becoming dynamic spaces and work more closely with patrons, yet, meeting patrons’ demands and expectations of libraries’ services is a difficult task. Nevertheless, a wise design of different areas can contribute to a great extent in the creation of a functional building, able to deliver a wider range of services and assist the different age groups, from elderly to children.
Chapter Two: Acoustic Design

In the previous chapter I have argued that the existence of different spaces, including social areas have become an important feature of library buildings. However, to successfully create these spaces that allow different activities and services to take place in the library, a well-planned acoustic design is fundamental. The shift from the exclusively print-based library collections to one of mixed media, required some adaptations in library building, such as the importance of silence in libraries now encouraging group work and learning, and the concept of large open spaces for patrons’ interaction as opposed to the concept of separate study rooms (Khan 7). In other words, coupled with the design of different areas there is an increasing tendency to create library buildings that encourage collaborative learning, instead of the traditional silent library building. Traditionally, old library buildings are characterized by high ceilings, hard floor surfaces, mostly of marble or wood, and large empty spaces, often with built book stacks. In these constructions, reading rooms are areas that produce echoes of long duration. Thus, in old library buildings the greatest single step forward has been the installation of carpets that with the sound-absorbing quality of books in quantity have contributed to a great extent to minimize echoes (Thompson 154). The following chapter will focus on different aspects of acoustics to consider when planning or renovating a library, and demonstrate how the tendency to create open social areas has been challenging acoustics of library buildings.

Reading rooms in public libraries are always places where an environment of deep silence is almost impossible. As a place where people read and study, the sound of people closing books, turning pages, moving chairs and walking along the corridors are unavoidable. For many years, when designing work places, such as a reading room,
architects interpreted and defined privacy in physical terms. That is, whether people could hear and see each other, as well as find a place with a certain privacy (Congdon, Flynn and Redman par. 9). It has previously been mentioned that libraries are currently opting to create wide open spaces, where silence is not a main feature, and carrels are most of the times inexistent. Yet, this shift may affect people’s ability to concentrate and focus. Moreover, open large spaces can be particularly difficult to achieve comfortable and functional acoustics within, due to the possible creation of echoes that allow the lowest noise levels to travel and reverberate throughout the library (Dunne par.3). Additionally, printers and computers also add to the noise level of the library. Therefore, acoustic design of library buildings has become a complex, and difficult task to achieve, as the building should be flexible enough to facilitate collaborative learning and open communication between patrons, but a proper environment for work and study as well.

The acoustic consulting firm Charles Salter Associates states that acoustic design for libraries involves the following issues: site noise considerations, including the control of noise transfer; establishing noise standards for each area, such as the limitation of excessive ventilation noise; room acoustics considerations; sound isolation between various use spaces and vibration control for mechanical equipment and audio/visual system considerations (Charles M. Salter Associates par.7). Furthermore, acoustic and sound control is exercised by choice not only of wall, floor and partitioning surfaces, but also of curtains and any other soft surfaces, such as seats, which tend to absorb sound. In reading rooms, books stacks will also be important elements in absorbing sound (Thompson 152). Library noise can be divided into two classifications: service noise and background noise. Background noise is the noise that is constant regardless of the time of day, number of people using the library, and the particular work being done by the library staff, these include: the traffic and other street noises from outside, and constant
sounds, such as ventilators. Service noise is noise produced by use of the library, such as people walking, opening and closing books or moving chairs (McDiarmind Jr and Tatum 201). The scale used in measuring sound is the decibel (dB) scale. According to the Centers for Disease Control and Prevention (CDC), one of the biggest operating components of the American Department of Health and Human Services, the acceptable dB level in a quiet library reading room is 40dB (Centers for Disease Control and Prevention par.9).

Traditionally, architects and designers have opted to place the noisiest spaces of the building next to each other. For instance, HVAC units (heating, ventilation, and air conditioning) will be placed near a mechanical area, rather than a quiet reading room (Brown 122). The disposition of the different rooms and areas within the library is a fundamental aspect of acoustic design to ensure that patrons using a quiet reading room are not disturbed by toddlers crying, or children playing in the children’s areas. Ideally, children’s areas and reading rooms are placed in different floors and wigs of the library.

Inevitably, some libraries will always be close to sources of external noise, such as road traffic and other typical city noises. These institutions should plan and be extra careful in minimizing the noise coming from the outside of the building. A good example is the New York Public Library, located in one of the busiest and central avenues of New York City. The architects can attenuate the background noise by using enclosing walls and windows that will be able to diminish the noise to a suitable level.

In recently built or remodelled libraries sound-absorbing materials are already part of the interior design. Several attractive and maintainable options and solutions are available to provide sound absorption on walls and ceilings. Usually, absorptive materials are covered with fabric, perforated metal or spaced wood slats surfaces that
allow the sound energy to pass through and be absorbed by the material located behind. Covering walls and floor surfaces with absorptive finishing materials, for instance carpet, fabrics and draperies, is an effective solution, as well as isolating HVAC equipment and ductwork with a sound-absorbing insulation. In open spaces, covering walls is particularly important, especially in high-ceiling areas. Furthermore, acoustical ceiling-tile systems, particularly those with fiberglass, are effective at reducing overall sound levels of a room, reduce reflected sound and will improve to a great extent conversational privacy in open spaces. Both floor and walls provide acoustical separation between adjacent areas, and when wisely selected, floors also reduce the sound of footsteps and other sounds from upper floors (Gatland II par. 25).

Multipurpose rooms require an extra careful acoustic design, as spaces with a high level of reflected sound may have poor acoustics, since the persistence of the sound creates undesirable background noise and will interfere with the ability to understand speech. These rooms have a high reverberation time, that is “the time required for the sound to be absorbed gradually and reduced below hearing levels” (Charles M. Salter Associates 7), therefore, these rooms should not be used for activities that require very different acoustics. In speech activities, a guest speaker for instance, the reverberation time should be low enough to allow each syllable and parts of speech to be understand clearly. By contrast, for music activities, a concert for example, longer reverberation time is preferred, since the musical sounds need to reverberate properly (8).

I have defended the importance of an acoustic design that allows open communication and interaction between patrons, and that enables different activities to take place in the library. Nonetheless, it is worth mentioning the importance of silence for activities that require customers’ concentration, hence the complexity and
importance of achieving a successful acoustic design. In this regard, the biggest challenge for most libraries is to create a building that successfully encourages and keeps spaces where patrons work together and interact with other patrons, as well as librarians, but also quiet and silent areas, still needed for patrons looking for a quiet place to concentrate and study. Studies have demonstrated that the impact of background sound and music can be seen directly in the bloodstream, through changes in blood pressure, circulation in brain and carbon dioxide. Whereas music and background sound accelerate respiratory rate and increase blood pressure as well as the heart rate, silence creates a relaxation effect, resulting in a lower blood pressure and heart rate. This relaxation effect creates better conditions to concentrate and focus on a specific task, such as reading or writing (Bernardi, Porta and Sleight 449 and Gross par.14). In other words, silence is an essential element when trying to concentrate. Therefore, some libraries prefer to keep a strict silence policy in the reading rooms, for instance The British Library. Some of the conditions to use the reading rooms of The British Library are: “mobile phones must either be turned off or on silent mode. Calls must not be made or received and texting kept to a minimum” (British Library par.6) and “equipment such as laptop computers, cameras and pagers must be on silent mode and headphones inaudible to other Readers” (par.7). The institution also makes clear that “The British Library is an environment in which both staff and Readers must be able to work without disturbance” and “if it is necessary to talk” users must do so quietly (par.6).

Additionally, worth mentioning is that studies have shown that human behaviour is influenced by the behaviour of other humans and social norms. In other words, our behaviour is influenced by the behaviour we believe other people expect from us (Cialdini and Trost qtd. in Aarts and Dijksterhuis 18). As a result, when entering a church or a reading room people try to keep the level of noise down as much as possible, because
other users are silent as well. Yet, patrons entering a reading room where speaking and group work are encouraged will tend to speak louder, even if unconsciously, for there are several conversations taking place in the same room. Thus, libraries’ employees should be able to play a key role in keeping an acceptable and stable environment in reading rooms, making sure that a particular group does not disturb others.

**New York Public Library**

The New York Public Library (NYPL) is a good example of a library where controlling and minimizing the background noise coming from the outside can become a difficult task, since it is located in one of the busiest streets of New York City. Cars, sirens, buses, people talking, and other city noises are unavoidable and can disturb people trying to focus. Also, the NYPL is a particular case due to the number of tourists visiting the library on a daily basis. Therefore, the library faces a big dilemma: how does the institution keeps the doors open to tourists wanting to visit the monumental rooms of the library, while also keeping their status as a research institution and a work place of several scholars. Undoubtedly, the constant movement of tourists entering and leaving the Rose Main Reading Room can distract and disturb people trying to concentrate. As previously mentioned, The British Library is very clear in keeping a strict silence policy, by contrast, the NYPL’s regulations only refer that “making unreasonable noise, including loud talking on a cell phone or otherwise” are not permitted (NYPL General par.4).

Although the background sound coming from the outside of the building helps to muffle some of the noise of the inside, the Rose Main Reading Room does not offer an ideal silent and quiet atmosphere to study. As a result, the institution keeps some study rooms exclusively reserved for scholars and researchers who need a quieter
environment. This separation is a good solution to secure a space with an adequate atmosphere for tasks that require high levels of concentration, and still keep a wide open space for small groups of students, people looking for a place to read or even tourists who want to use a computer. It is also worth mentioning that in big spaces, such as the Rose Main Reading Room, the sound of computers is hardly discernible, thus, when it comes to sound, this will not be distracting. The number of people constantly leaving each computer, however, can be diverting, as some people may come to work and use a computer for several hours, whereas tourists, for instance, may only use a computer for ten minutes.

In the Rose Main Reading Room, the seven floors of book stacks contribute to absorb and muffle some of the background sound. The children’s area was also wisely placed at the ground floor and will not disturb the study rooms, on the second floor, nor the main reading room, on the third floor. The installation of acoustic tiles and panels in the NYPL is a complex task, as this would interfere with the emblematic Beaux-Art architecture of the building, for example, the fifty-two foot tall ceilings of the reading room, decorated by murals of vibrant skies and clouds.

**Columbus Metropolitan Library**

The Columbus Metropolitan Library’s (CML) main branch is an example of a building where the renovation plan involved a redefinition of the concept of the reading room and the atmosphere the institution intends to create there. The reading room will consist of a two-floor multifunctional area that can be used by patrons not only to read and have coffee, but attend conferences and other activities as well. From this, some questions arise, such as: how does the institution guarantees that a certain environment and an
adequate level of noise are maintained in an area that is both meant for study and patrons’ interaction? Teenagers, for instance, should use the teenagers’ area, on the second-floor, or the homework centre, rather than the main reading room to study. Library staff will not only help students to find materials to support their study, but should also ensure that students studying in groups maintain an acceptable level of noise and do not disturb other students. The children’s area and the homework centre are both located at the first floor. Even though the rooms are separated by walls, which helps to concentrate the noise coming from the children’s area, library employees and parents should insure that children keep an acceptable level of noise. Additionally, the building will also include several meeting rooms, meant for bigger groups, and seven small study rooms for two to four people (Robertson).

Although seven of these smaller study rooms may not seem much, it is important that the library keeps these places, since many activities will take place at the main reading room, which will be distracting for customers looking for a quiet space to read or work. The number of sofas and other seats, a wise choice of floor finishes and sound-absorbing tiles should be able to absorb most of the noise of the reading room and avoid echoes. However, since there is no silent reading room that may be disturbed, the focus should be on achieving a comfortable and functional acoustics that encourages and allows group work, but also a proper environment for reading. The regulation of the CML mentions that customers are not allowed to make “unreasonable noise including: loud talking, singing, boisterous activity, cell phone and audio/visual equipment usage” (Columbus Metropolitan Library par. 7).
Amsterdam Central Library

Due to the high ceilings and the reduced number of walls, the OBA can be a difficult building to achieve a functional and comfortable acoustic within. Even though the acoustic design, by the acoustic consulting firm Cauberg-Huygen, reduces most of the echoes and sound transfer, the children’s space, an open and roofless area, in contact with the rest of the building can become a main source of noise. In January 2016, during a visit to the OBA, despite the little number of children in the library, some echoes and footsteps were still noticeable.

At the entrance level, several work places, computers and comfortable seats are available, however, some of these places face the children’s area that depending on the number of children using the space at the time, can become distracting, not only in acoustical terms, but visually as well. Therefore, it may be a pleasant place for users looking for a comfortable place to sit, but not for students and people looking for a quiet place to study or read. Moreover, a piano also adds to the level of noise, as customers are allowed to play, but is also attracts children that get the opportunity to play a piano for the first time, which may divert some patrons. Nonetheless, aside from the floor and wall finishes, the great number of seats and sofas also help to control echoes and sound transfer.

Between the third and sixth floors, distant from the main stairs and surrounded by book stacks, several quieter study places are available. In other words, the institution has opted to create several smaller study areas throughout the library, as opposed to a separate reading room. These smaller areas with limited seats are a good solution, for they avoid the concentration of several groups in the same place. The regulation of the OBA mentions that: “making or taking mobile calls can be disruptive for other visitors
and is only allowed in the indicated areas”, and that the “use of e.g. MP3 players must not be disruptive for other visitors. Music or sound from computers is only allowed if headphones are used” (Openbare Bibliotheek par.15).

In short, I have shown that in recent years the traditional quiet and silent library has been replaced by a dynamic building where group work, interactive learning, and communication between patrons are encouraged. This shift, coupled with the tendency to create different spaces make the acoustic design an essential, yet difficult task to achieve. The acoustic design will have to be flexible enough to maintain an adequate environment in a building where activities that require different acoustics take place. It may become a difficult task to balance and control the unwanted sounds, such as outside traffic, and the desirable sounds, for instance a guest speaker. In this regard, placing each area of the library wisely is a simple solution to ensure customers in the reading room are not disturbed by the sound of the children in the children’s area, nor the constant movement of people entering and leaving the library, for instance. Furthermore, another big challenge is to maintain attractive social spaces, but a proper environment to read and study as well. For this reason, I believe librarians and the employees of each institution should ensure that a stable environment is kept in the building, including in the social areas where different groups should be able to work in the same space.
Chapter Three: Lighting Design

Lighting design has always been a major aspect when planning a library building. The International Association of Lighting Designers (IALD) defines lighting quality as an “optimum balance among human needs, architectural considerations, and energy efficiency” (IALD par. 2). The public library, as a place where people read, study and need to concentrate, should be able to provide the right conditions and environment, this includes a comfortable lighting. The following chapter will focus on some of the major aspects to consider when planning a libraries’ lighting design. I will demonstrated how variation in lighting contributes to create different spaces and atmospheres in public libraries, as well as in the design of a comfortable and functional building. In this regard, it is important to start by referring some important definitions.

The total light visible of a light source is measured in lumens, whereas the spread of light over a surface is measured in lux, or foot-candles, the American unit (Malman 2). One lux equals one lumen incident per square meter, and one foot-candle equals one lumen incident per square foot. Lighting design is a complex and difficult field; even in one of the most easily definable aspect of lighting, the intensity, standards may differ widely. Thus, intensity of light is one of the most obvious elements to be considered, but is not the most important one (Thompson 139). Also, it is worth noting that there is no absolute standards by which success can be guaranteed in planning the library’s lighting, and the best solutions will be different for each library, depending on the type of building. Additionally, different countries have different regulations, in the United Kingdom, for instance, The Health and Safety Executive (HSE), the national independent inspector for work-related health, safety and illness, recommends that areas where people work or need to concentrate have an illuminance between 300 lux and 750 lux (Health and Safety
Executive par.8). Whereas in the United States of America, the Occupational Health and Safety Administration (OHSA), the federal agency charged with enforcement of health and safety regulations, recommends a minimum illumination level of 30 foot-candles (322.92 lux) in places where people need to concentrate (Occupational Health and Safety Administration par.5).

It is important that a lighting consultant is hired to work with the architect and designers in the lighting design, as poor lighting can have negative effects, such as headaches, distractions, glare and low productivity. A successful lighting design is the result of both technical skill and art on the part of architects, engineers and lighting professionals. Also, the level of illumination is undoubtedly connected to some important aspects of the building such as user comfort, energy consumption and even the use of space. This is particularly true in more recent buildings, where visual tasks and technology are more diverse and require new types of lighting. In using light to contribute to the overall design of the building, the architects and engineers should employ variations not only of intensity but of colour, quality, direction, shape and contrast, as well. These different variations will allow the architect to indicate change of mood in different parts of the building, and to produce interest, quietness, or other atmosphere the architect and librarian intend to create. Nowadays, due to the different areas available in library buildings, such as children’s areas and cafeterias, lighting is essential in creating these different environments and spaces.

When late nineteenth century and early twentieth century libraries were built, daylight was the principal focus and source of light, and the library design ensured that readers were seated and oriented to make the most of the natural light available (University of Cambridge par. 7). The most common solution was a sky-lighted ceiling
and large windows high above the reading room. Ceiling height of approximately 4.50m were recommended to provide enough space for high windows and better ventilation. Over the years, electronic lighting reduced the amount of windows needed and enabled architects to develop more sophisticated lighting designs (Oehlerts 137).

From the view point of functional efficiency it would be much easier to use only artificial light, meaning, controllable and adjustable light. In fact, several library rooms without natural light have been designed in many parts of the world, and are physically acceptable (Thompson 139). Yet, I believe that daylight is the most effective source of light, for it easily creates an atmosphere of visual comfort and quietness, essential in the wide open areas that characterize today’s library buildings. Also, daylight is traditionally a desirable building feature and a symbol of good design, but will also enable the institution to reduce energy consumption. There are three fundamental design issues to consider in daylight design: firstly, sun control, to mitigate any increase in the cooling load and to control direct glare; secondly, glare control, to create and maintain comfortable brightness distribution; finally, variation control, to avoid any areas with insufficient lighting (Dean 11).

By using big windows, the perimeter of the library can be lit for approximately 6m from the exterior wall. Usually, the higher and taller the window, the deeper the light penetration. Clear glass is recommended, yet, this requires a wise exterior sun control design to provide adequate shading. An exterior shade can reduce by 80% the incident solar energy (17). Moreover, in certain countries sun control should be carefully planned in order avoid glare and heat gain. Another key point to remember is that the amount of daylight and its direction at the windows and roof of the building will vary during a
typical day as the sun moves, and during the different seasons, as the sun’s predominant position in the sky changes as well.

On the other hand, sunlight also has inconveniences, for instance paper, vellum, and book covers can be damaged by light. While valuable material is frequently kept in rooms with a strictly controlled atmosphere, book-stacks in the main reading rooms should not be exposed to sunlight for long periods. The damage is mostly caused by ultra-violet (UV) radiation emitted by all white light sources, daylight being the most dangerous. The damage will depend on the intensity of the light and, of course, the length of exposure. Generally, the higher the intensity, the greater the damage, and the longer the exposure, the greater the damage. For this reason, windows should be provided with proper coating to control UV radiation. Exposure to daylight will hardly be of any consequence when materials are being used, and studied by patrons, yet, when materials are exposed for long periods, the damage can be irreversible (Thompson 139).

I have defended that daylight is the most effective lighting source, yet, during cloudy and rainy days, daylighting will not be sufficient to maintain an adequate lighting level. Also, it is important that the library maintains a relatively constant level of light for visual tasks, as inconsistency in illumination is distracting and uncomfortable. In this regard, electric lighting is a key element in maintaining a comfortable and stable level of light.

The electric devices used to create artificial light by use of a light bulb are called lighting fixtures. Despite of the light sources used, the number of different lamps used in the illumination design should preferably be minimized to simplify lamp stocking and maintenance. Fluorescent lamps produce light by passing an electric current through a gas inside a glass tube. Fluorescent sources are an efficient solution, for they have a long
durability, and are available in a wide variety of shape and sizes. Fluorescent lamps are available in cool (4100º), medium (3500º) and warm (3000º) temperatures (Malman 5). Light can have different colour temperatures, measured in kelvin. Bulbs with a low kelvin value produce warm colours, while bulbs with a higher kelvin value produce a cooler and blue light (Philips How par. 3). One kelvin equals 1º celsius, however, the kelvin scale has it start point at absolute zero, which is -273.16º celsius (Dalrymple 230). The choice of the lamp colour is mainly an aesthetic choice, for it will not affect the light levels nor its costs. Fluorescent lamps contain a small quantity of mercury to help start the lamp, yet, lamps with reduced mercury content are already available. These lamps are a good alternative as they add little or no costs and have no negative impact on the lighting quality (Malman 5).

Incandescent lamps produce light by passing an electric current through a filament. These lamps produce a warm and comfortable yellowish light colour, but do not last long, therefore are not a good option for big buildings, such as a public library. Nevertheless, due to their warm light colour, these lamps can be used in some areas, such as the entrance, to make the library look less institutional. High-intensity discharge (HID) sources include metal halide lamps and sodium lamps. Both lamps have a long durability and produce light by energizing a gas inside the lamp. Metal halide lamps have a comfortable colour, similar to incandescent light (7).

Nevertheless, LED lighting sources are most of the times the best solution, for they have a long durability, are energy efficient and do not contain any UV radiation. A Lighting Emitting Diode (LED) is a diode responsible to emit light. Whereas fluorescent lamps produce light by passing the electric current through a gas tube, and incandescent lamps produce light by use of a filament, LED light bulbs use a semiconductor device
that produces light when an electric current passes through it (Philips What par.2). As previously mentioned, light bulbs are available in a wide variety of colours that will create different environments and atmospheres, yet, for spaces where a lighting level close to day light is desired, architects should opt for daylight bulbs, for they provide the closest lighting level to that of natural light, and will easily blend with daylight. The combination of different lightings is an important part of the building’s aesthetic concept. Architects and lighting professionals should work closely to consider carefully the possible effects the artificial lighting may have upon readers. Furthermore, artificial lighting sources should be used to avoid glare, reflections or areas that are badly illuminated. It is worth mentioning that visual comfort is more affected by increased luminance of the surrounding area than is the actual task of reading. In other words, increase in the luminance of the surroundings will influence visual comfort, but the reading itself, however, will most likely not be affected (Thompson 140). Yet, it is believed that private reading in public spaces, such as public libraries, is still an issue that has not been well addressed by current lighting guidelines, which do not focus on qualitative aspects, but quantitative (University of Cambridge par. 7).

Reading rooms, as well as working surfaces where documents of little contrast, or with smaller details, such as maps, are studied, require an extra careful lighting design. A good solution is to have a fairly low level of overall lighting, and that reading surfaces have their own desk light with individual control, allowing intensity adjustment. Book stacks illumination must be carefully planned as well, depending on their closeness together. Ideally, book stacks are lit across the stack face, so that patrons can easily read the titles, and quickly find the call numbers. An easy and effective way to light book stacks, is to light the upper shelves adequately. Illumination between book stacks should also be considered, as a safety measure.
As previously mentioned, one of the many factors that may affect the quality of a lighting design, is glare, which causes discomfort, or reduced visibility. Libraries with open areas should address this issue carefully because of the greater number of lighting sources. Glare situations will depend on various factors such as brightness itself, both from the source and by reflection, but size and position of the source as well (Thompson 140). Direct glare results from high brightness, such as light coming from the windows or ceilings that are directly in the field of view. Indirect glare occurs when light is reflected off glossy surfaces or screens in the field of view. Especially in working areas, such as reading or study rooms, glare can become quite uncomfortable and distracting. Simple solutions can help reduce and avoid glare. The most effective way to avoid glare is by directing all light sources downwards, shading them from horizontal emission. Also, working areas should be placed where sunlight will not be in the indirect glare zone, and reading surfaces should be selected carefully, for glossy surfaces increase glare and reflection.

The Columbus Metropolitan Library’s (CML) main branch is currently closed for renovations. In March 2016, when contacted and asked about the lighting design the institution informed that the lighting was still being tested, but that the main change is the use of daylight, as the main branch will have several glass walls. Thus, there is no relevant information to add about the CML lighting design, therefore, I will focus on the New York Public Library and the Amsterdam Central Library. Nonetheless, worth is mentioning that given the importance of planning the lighting design carefully and in advance, it surprising that the CML is still in the process of testing it, and does not have much more to say, other than the preference of daylight and the existence of glass walls.
New York Public Library

The New York Public Library’s (NYPL) main building, also known as the Stephen A. Schwarzman Building, has since its early years been one of the most famous landmarks of New York and an obligatory stop for tourists. Therefore, the marble building holds not only the position of a prestigious research institution, but of an emblematic architectural symbol of New York City, as well. The building dates from the period when maximizing daylight was a major concern in library design, consequently, the big windows are a main characteristic of the building.

Given the importance of the NYPL’s main building, before mentioning the interior lighting, I will make a reference to the exterior lighting. Located in one of the busiest streets of New York City the main building requires an effective exterior lighting able to at night maintain the building’s imposing position. In 2011 a three-year restauration and preservation project of the building that included a rearrangement of the exterior illumination was completed. For the illumination the French engineer François Jousse, responsible for lighting 300 monuments in Paris, was consulted. In 2007, Paul LeClerc, at the time president of the NYPL, explained that his ambition was “for this to be the building you simply must see in New York at night time because it is so beautiful and it is so important” (LeClerc qtd. in Pogrebin par. 7). The Petit Palais, in Paris, served as a model and Claude R. Engle Lighting Consultants, responsible for the lighting design of the Pompidou Centre in Paris and the I.M Pei’s pyramid at the Louvre, was hired. The main goal was to focus and emphasize specific details of the building, and light the library’s facade at an angle, rather than lighting the entire building. Previously, the building was lit by floodlights placed on the parapets of the higher surrounding buildings (Allanbrooke and Capolino 42). The new lighting design includes lights mounted on the
highest streetlights across Fifth Avenue, and on posts of approximately 6-metres-high on the north and south sides of the plaza. A stronger beamer illuminates the south facade, with light fading as it reaches the bottom. Warm colour lights illuminate the building’s facade, the Corinthian columns, and the two emblematic lions, known as Patient and Fortitude (Sciulino par.2)

Having mentioned the exterior lighting, I will now focus on the interior lighting design. In Rose Main Reading Room, twenty-eight sumptuous grand chandeliers suspended from the high ceiling illuminate the reading surfaces and maintain a constant lighting level. The chandeliers, shown in Figure 15, are an emblematic symbol of the reading room, but not an easy and smart solution, as maintenance is difficult. Nonetheless, given the importance of the reading room as a tourist attraction and iconic symbol of the library, the chandeliers are an important part of the room. Each working surface has a number of desk lamps, this has some inconveniences, since not everyone has access to a desk lamp. Yet, elderly or people with visual impairment require extra lighting, so even if not available for everyone, desk lamps are important and should be available. Moreover, the big windows across the room light the entire room, creating a sensation of openness and providing a comfortable level of daylight, as demonstrated in Figure 4. The book stacks are lit horizontally at the upper shelf which avoids glare.

Outside the Rose Main Reading Room, the interior of the building is lit by other suspended lights or floor lamps. Inside the building, marble flooring is predominant, however, in the Rose Main Reading Room the floor is of a neutral colour, which reduces glare and reflections. Also, the oak reading surfaces, of a natural colour, also contribute to reduce glare and reflections.
Figure 13: York Public Library: Main building lit at night (The Sargasso Sea)
Figure 14: New York Public Library: Floor lamps in the main entrance (The Sargasso Sea)
Figure 15: New York Public Library: Suspended chandelier of the reading room (Christine Austin Design)
Figure 16: New York Public Library: Book stacks lighting of the reading room (Johnson)
Amsterdam Central Library

The exterior of the Amsterdam Central Library (OBA) reflects the innovative architectural style of the inside: openness, clarity and a modern design. High ceilings and big white walls contribute to the sense of openness and reflect the daylight entering through the big windows. The lighting design is unquestionably a major feature of the building in creating different atmospheres and contrasts between darker and lighter areas. The glass walls provide not only a good level of daylight, but a nice view over Amsterdam as well. Additionally, exterior sun control is incorporated in the architecture of the building, as an exterior stone structure shades part of the glass surface, as shown in figure 17.

From the entrance area the sense of openness and transparency, the illuminated stairs and modern suspended white lamps introduce the modern design of the building. The predominant dark wooden floor creates and important and comfortable contrast with the white walls. Furthermore, as the interior of the building has very few walls, yellowish lighting columns and the illuminated escalator that runs vertically the central volume of the building work as a main source of artificial lighting, able to illuminate all the floors, demonstrate in figure 18. Since the building allows for much daylight to enter through the big windows, reading surfaces have individual lighting, important to avoid reflections and glare. At the ground floor, low book stacks with magazines, shown in Figure 19, have a very attractive lighting that resembles a shop window. Multimedia areas are also lit carefully, with different light colours and intensities, creating the proper atmosphere and lighting for a comfortable use of computers.

The OBA is a perfect example of a building with a successful lighting design, where daylight and artificial lighting are combined to create a comfortable environment
of openness and clarity. Different lighting densities and colours create different spaces and contrasts, with the escalator linking the building as a whole.

Figure 17: Amsterdam Central Library: Exterior of the building (Best Design Books)
Figure 18: Amsterdam Central Library: The illuminated escalator
(Arch Daily)
Figure 19: Amsterdam Central Library: Magazines with attractive lighting (Arch Daily)
In short, I have argued that there is no standard solution that guarantees a successful lighting design. Nevertheless, I believe that daylight is the source of light that better creates a comfortable and pleasant environment in library buildings, and allows the institution to reduce energy consumption. An effective artificial lighting, however, should be used in order to ensure that no area is not properly lit, to maintain a stable level of light and control glare. Moreover, lighting design plays a major role in designing each space of the library, as lighting variation in colour, as well as temperature and intensity will enable the architects to create different atmospheres. All things considered, when combined with artificial lighting, daylight can create a comfortable environment of clarity and openness, while also maintaining a relatively constant level of light.
Chapter Four: Library Security

“Library security” is a broad term that may include several issues, from crime prevention strategies, safety of patrons and library staff, collections preservation, catastrophe planning, among others. In this chapter “library safety” refers to crime prevention strategies. Even though book theft and vandalism of library collections are not a recent issue and despite the new technologies available, these sort of incidents keep happening (Cravey qtd. in Higgins 9), thus are still a major concern of librarians. Most likely earlier libraries also took precautions to protect their valuable materials. Chaining books to tables and shelves was an effective solution also used by monks during the Medieval Ages (Lincoln and Lincoln xi). The following chapter will focus on different strategies and mechanisms that help libraries reduce and prevent theft and vandalism, but will also mention some of the reasons why these incidents keep happening.

The easy access to online catalogues, where the content of libraries’ collections, including valuable materials, are available, and a growing number of people willing to express their personal beliefs and convictions by destroying material from libraries, are two of the main reasons for the continuing loss and damage of libraries’ collections and materials (Higgins 2). Today, most public libraries deal with people of many religious groups, as well as atheists. Consequently, libraries face the difficult task of providing sacred texts and books about faith, but books reflecting non-religious views of the world as well, in such a way that people feel their faith is treated with respect and that no religious group is privileged over others. Yet, some religious groups try to pressure libraries to present their sacred texts in a certain way. These demands may result in conflicts between religious groups and librarians, and in more extreme cases, patrons that are willing to destroy religious or atheist materials that they consider to be offensive.
(Ball, Iqbal and Vincent par.4). Religion is, however, not the only reason why people mutilate libraries’ materials. Some customers also mutilate books to make a certain statement of political or social beliefs. In San Francisco Public Library, for instance, during 2001 the library’s staff started to notice that several books on topics such as women’s health, HIV/AIDS, bisexuality or transgender, were vandalized and destroyed, demonstrating that these are topics that some patrons are not comfortable with, or are considered inappropriate material for libraries (San Francisco Public Library par.1). Furthermore, it is also very common, in academic libraries as well, for patrons to write on the books, use highlighters, make notes on the margins, or even cut some parts or entire pages to avoid having to use a photocopier (University of Oregon par.2).

Crimes in libraries can take different forms, such as crimes concerning the library’s collection, crimes against the physical structure of the library and crimes concerning users of libraries (Huska par.2). Public libraries struggle with the inherent risk of damage and loss to collections that must be balanced with the library’s mission to make the collection accessible and open to patrons. In addition, as a public building, everyone can enter a library, including mentally ill or aggressive and dangerous patrons, consequently, librarians are sometimes presented with unexpected situations that librarians in the past had not to be prepared or trained for (Bean 23). A study published by the American Library Association shows that public libraries are within the institutions that have been affected by deinstitutionalization. People with some sort of mental illness discharged from mental hospitals, without any follow care, see in public libraries a comfortable place, with different activities to spend the day (The Treatment Advocacy Center par.3). Employees of the New York Public Library, Columbus Metropolitan Library and the Amsterdam Central Library receive proper training to learn
how to handle aggressive and dangerous patrons, or other difficult situations (Bush, Robertson and Van Leeuwen).

Designing and planning the library building in such a way that library and security staff can easily control the behaviour of all users, is a major issue of library buildings (Faulkner-Brown 72). In this regard, the tendency to opt for open and wide spaces may seem easier to control, as security staff can easily see the entire room; however, when these open spaces get crowded they can become difficult and confusing areas to control. A good solution is to reduce the number of entrances and exits, forcing everyone to pass through a security or service desk when entering or leaving the room. Unfortunately, over the years controlling staff has also become a major issue, as cases of thefts where library employees are involved have happened more than once. For instance, in 2000, the Bibliothèque Nationale de France, discovered a thirteenth century Hebrew Bible was missing. In 2003, an anonymous letter denounced the internationally praised specialist Michel Garel who had stolen and sold the valuable document (Sanson 107).

As a result, over the last years, libraries have developed increasingly sophisticated security systems and crime prevention strategies to combat crime and theft of collections and materials. Depending upon the scale of security each library building needs and the resources available, the range of solutions can involve staff training and vigilance, ownership marks on library materials, stack access identification, theft detection systems and electronic security devices at entrance and exit doors, for instance RFID gates and security equipment such as closed-circuit television monitors (Dewe 173). The New York Public Library, the Columbus Metropolitan Library and the Amsterdam Central Library contain closed circuit television monitors, contracted guards
and electronic devices at the entrance and exit doors (Bush, Robertson and Van Leeuwen). Nevertheless, ownership marks, such as stamps, and electronic book theft detection systems are not completely successful, as they do not protect rare books and manuscripts from damage. Furthermore, pages with library stamps can be ripped from books, and electronic detection systems are usually detected by thieves. For this reason, most libraries opt to have a RFID system. Radio Frequency Identification (RFID) is a technology that uses radio waves to identify objects. This is possible by placing a small RFID tag, equipped with a chip and an antenna, inside a book, or other library’s materials, giving each item an identification number. It is the information contained in this tag that is read using radio frequency technology, which allows the RFID gates placed by the entrance and exit doors to read the tag at a distance, regardless of the item’s orientation. As result, if any material of the library passing the gate has not been checked out an alarm is turned on (Shahid par.5).

Libraries holding valuable and special collections should plan extra security measures and control the access to these materials. The Association of College & Research Libraries, a division of the American Library Association, defines special collections as “repositories containing rare books, manuscripts, archives, and other antiquarian and special materials” (par.1). The security of special collections is nowadays especially significant since the access to online catalogues and the information available on the internet can lead to people’s awareness of the value of these collections, as a result, this may increase the risk of theft.

The Association of College & Research Libraries advises libraries holding a special collection to appoint a Library Security Officer (LSO), who should have primary authority and responsibility to organize the security program and a thorough knowledge
of the building’s security needs (par.5). In addition, the LSO should develop a written policy on the security of the institution’s collections, in consultation with the library’s employees, administrators and legal authorities. This policy should be reviewed and updated periodically to ensure that the institutional needs are adequately addressed (par.7). It is essential that the entire security strategy of the institution is consistent, therefore the LSO should be involved with the implementation and development of general security measures, as these may affect and influence the security of special collections. The area where the special collections are kept should have as few access points as possible, and lockers should be provided for user’s belongings, as the personal belongings allowed in the room should be restricted and controlled when entering and leaving the room (par. 10). Institutions should also have clear regulations for the materials patron can use while using and studying the collections. People consulting the valuable collections should be able to make notes (not on a document itself), however, it is highly recommended that only pencils are allowed. The British Library, for example, only allows patrons using the collections to use a pencil, and “writing in or marking collection materials is not permitted in any form” (British Library par.9).

In January 2001, the Royal Library of Denmark, for many years considered one of the most effectively secured buildings in the country, discovered the institution had suffered serious thefts in its special reading rooms housing maps, manuscripts and rare books. Valuable maps had been removed from folio editions by someone skilled enough to cover and dissemble his thefts. Due to the security cameras installed in the building and special reading rooms the institution was able to have good images of the thief, how he had been able to steal the documents and leave the building. The institution quickly informed other libraries housing historical and special collections. During the following weeks, however, the thief, or his accomplice, were able to visit the Helsinki University
Library, the Royal Library in The Hague and the Royal Library in Stockholm. After informing other Nordic libraries, the Danish Royal Library was contacted by several of these institutions and it became clear that the thieves had been visiting and stealing them as well, including the Bibliothèque Nationale de France, the National Library of Wales, the Cambridge University Library, the British Library and others. Nevertheless, the Royal Library of Denmark had never been informed about these incidents (Nielsen 293).

This proves the existence of two main issues in library security: first, a clear lack of communication between libraries, national and internationally, and second, the difficulty librarians and authorities have in defining a clear profile of book thieves or people willing to damage library’s collections, as academics and librarians, people with the proper skill and knowledge, are also willing to steal and damage materials. After the incident in the Danish Royal Library, aware of the lack of communication between libraries and the feeling of shame that leads institutions to not be open about their theft incidents, some employees of the library decided to organize a Conference on Library Security that took place in Copenhagen, May 2002. As a result, lively and open discussions took place between chief executives, and chief security officers from twenty European countries and the United States of America (294).

Communication between institutions could increasingly help libraries to protect their materials from people that represent a threat. However, as previously mentioned, some institutions are uncomfortable about their theft incidents, therefore, prefer not to inform other libraries that they have been stolen. Yet, this will have implications for other institutions, who not aware of this incidents and the danger some people may represent, allow them to steal or damage other valuable materials. Even though databases of stolen and lost antiques and collectables, including rare books, already exist, for
instance Interpol’s database, a thorough database should be created by libraries as well. This would allow not only institutions to register stolen materials, but add names of people who represent a threat as well. Interpol states that “the black market in works of art is becoming as lucrative as those of drugs, weapons and counterfeit goods” (Interpol par. 2), therefore Interpol strongly advises institutions holding valuable collections to participate in the exchange of information.

Profiling library criminals has become a difficult task, as it is difficult for librarians and library employees to determine who represents a threat. Mentally ill people may present suspicious behaviour from the moment they enter the building, and employees should know how to handle these situations. Nonetheless, there are also people paid to steal a certain book or document, and, as mentioned before, scholars may also represent a threat for special collections, as they have easy access to special rooms, know what they are looking for and are skilled to steal the original document and leave a replica (Higgins 8).

In conclusion, libraries face the difficult challenge of keeping the position of a welcoming and open institution, but the responsibility to protect their collections as well. Despite the innovative and technological solutions available to support libraries’ security systems, damaged materials and thefts still occur. Two main issues seem to be problematic: the difficulty libraries have in defining a clear profile of library thieves and criminals, and a lack of communication between institutions. Even though some institutions have been in contact and are willing to exchange some of their experience, public libraries should also work closely with other institutions holding valuable collections, such as museums and archives, but with international authorities as well, such as Interpol. Throughout the chapter I have mentioned the main aspects of the NYP,
CML and OBA security systems, and there are is no further relevant information to add, therefore this chapter will not be followed by a section with details on the three institution. It is worth mentioning that when contacted and asked about their security systems, all institutions mentioned that there is not much they can share with the outside, and that the institutions use similar strategies to reduce theft and vandalism: contracted guards, theft detection systems at the entrance and exit doors, proper training of employees to handle difficult situations and closed-circuit television monitors.
Conclusion

This dissertation focuses on the major architectural and design changes in library buildings, as a result of the changing role of these institutions in contemporary society. It aims to investigate the design characteristics that have replaced the traditional silent and quiet building, where the abundance of book stacks were the major feature. For several years the “ideal library building” consisted of a big reading room surrounded by book stacks, in some cases a small community room was also available. However, the development of digital technologies has changed and transformed institutional practices of libraries, which led to changes in the organization and design of library buildings, as well..

Librarians became aware that if public libraries were committed to be accessible and open institutions this also meant that library buildings would have to be more functional, include more spaces, offer more services, and a wider variety of material formats. In other words, many public libraries have been transformed from a “finite space with finite resources to a finite space with infinite resources” (Kent 211). For this reason, I have argued that a library building that enables the existence of different services and activities, as well as housing collections in different formats, such as print, electronic, or audio-visual, is a main concern. Also, due to the availability of most of libraries’ collections in electronic formats, it is essential that libraries create alternative and interactive spaces as well as activities, able to attract patrons that do not need to visit the building to borrow a book or other materials.

As a result, creative and interactive children’s areas, multimedia rooms where patrons can access computers and the internet, and social areas meant for patrons’ interaction are available in most public libraries. I have defended that the first contact
children have with public libraries happens, most of the times, in the children’s area and will influence their behaviour towards libraries in adulthood, thus, creating attractive children’s spaces is essential and has received much attention in recently built or remodelled library buildings. The Amsterdam Central Library is an example of an institution that has a wide and innovative space for children. The creative book stacks and the screens spread over the room promote the use of the materials, in addition, comfortable seating is available both for parents and children. Multimedia spaces have also become an important part of library buildings, as some patrons depend on libraries to access a computer and the internet. Moreover, I have also stated that social areas and “loud rooms” are also important elements in today’s library buildings, as these areas have been replacing the traditional quiet and silent reading rooms. This has been an important shift, as for many years, the library, as a public building, was missing a place that encouraged patrons’ interaction and communication. Therefore, these areas have become important in creating a feeling of community, and belonging within patrons, which will also leads patrons to go back to the library.

Nevertheless, the existence of social and loud spaces is only possible with an effective acoustic design. I have defended that the acoustic design of library buildings has become a more complicated aspect, as it will influence to a great extend the ability of the building to hold different activities and spaces in the library, but also because the wide open areas used in new buildings are more difficult to acoustically control. Furthermore, the acoustic design should ensure that patrons in the reading room are not disturbed by the noise coming from the children’s area, or by the sound coming from an auditorium where a conference is taking place, thus, the simplest solution is not to place silent areas near louder areas. The biggest challenge in designing library acoustics is to create a building that enables both silent places for study and concentration, and social
areas, where talking and group work are encouraged. The Columbus Metropolitan Library’s main building, for instance, will require a well-planned acoustic design, for the main reading room will consist of a wide open area meant for patrons to socialize or meet a study group, but also for people looking for a comfortable place to read or work. Since there will not be a silent reading room, the acoustic design should ensure it creates a comfortable place for both social activities, and activities that require higher concentration.

Lighting has, for obvious reasons, always been a crucial element of library buildings. I have argued that due to the different areas, as well as activities and materials available in libraries, variation in lighting has become an essential element of the lighting design, as for instance, a reading room and a multimedia space require different lighting colour, quality, direction and shape. Furthermore, I have stated that natural light should preferably be a main source of light. However, this requires certain precautions: UV radiation protection, sun control and variation control, to avoid areas with insufficient lighting. On the other hand, artificial lighting is essential in maintaining a constant lighting level and in providing additional lighting when sunlight is limited, for instance in rainy days. The Amsterdam Central Library is a good example of a building that has successfully maximized the use of daylight. Transparency and clarity are two main characteristics of the building, due to the number of big windows that allow daylight to enter.

Finally, as to security, even though library security and crime are not a recent concern, due to the easy access to online catalogues and an increasing tendency to vandalize library materials to make a statement of political or religious beliefs, security is still a major aspect in library buildings. Institutions holding special collections should
plan their security system extra carefully. Despite the technologies available to better control people’s behaviour in libraries two main issues that could help reduce library crime remain: a clear lack of communication between institutions and the difficulty library employees have in recognizing who may represent a threat for libraries’ collections, as not only patrons, but also library employees and scholars have been involved in these sort of crimes. If institutions shared their experience and informed each other about theft and vandalism incidents, some of these crimes could be avoided, as institutions would be aware of some of the people that may represent a threat to their collections. The New York Public Library is an institution that requires a highly organized and planned security system, not only because of the valuable collections and documents it holds, but also because of the number of visitors and tourists it receives daily. A building that has constantly people getting in and out may become a difficult place to control, therefore, it is essential that the New York Public Library’s security team works closely with the rest of the building’s employees to define a clear and organized security system.

This dissertation aims to present different solutions and options for effective lighting, acoustic and security design, as well as illustrate how they contribute to create different areas and spaces within the library. I have done so by using three existing library buildings to demonstrate how they apply some of the design solutions mentioned, but also to illustrate that there is no standard solution or formula for a functional library building. A team of architects, designers and librarians should work closely while planning a new building, or remodelling an existent one. Librarians should share their experience and make sure they present a clear idea of what they want the library, as a public building, to offer. I have, however, come to the conclusion that library buildings, more than ever, encourage patrons to enter, not only to look for a book, but to participate
and interact with other patrons as well. The tendency is to opt for wide open areas that allow patrons to see across the room and encourages group work; as well as glass walls that allow not only much daylight to enter, but also emphasize the sensation of transparency and clarity.

Furthermore, it is important to mention that all the suggestions and solutions presented in this dissertation are meant for public libraries, therefore, academic library buildings will most likely require other approaches and planning. Thus, further research would have to be conducted in order to understand how these different types of library buildings differ from each other.
Works Cited:


Feinberg, Sandra and James R. Keller. *Designing Space for Children and Teens.*


--“Columbus Metropolitan Main Branch.” Message to the author. 6 Apr. 2016. Email.


