

# THE FUTURE LIBRARY IN THE DIGITAL AGE

By  
Erald Kokalari  
Bachelor of Architectural Science  
Ryerson University  
Toronto, Ontario, Canada, 2012

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## **Abstract**

The technological revolution and the resulting inception of the World Wide Web have had an unprecedented effect in the ways we find, produce, and contemplate information today.

Within this evolution, the public library plays a pivotal role as it finds itself in the middle of this shift, needing to effectively respond to the exponential rate at which the 'digital' is growing.

The public library stands as not just a symbolic institution responsible for conserving and distributing information, but also as an extension of the public realm itself. This vision goes beyond the agency of the book and looks at the library as a socio-cultural vessel that can be responsive and dynamic when seen through this new digital lens.



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## 1.0 Introduction

### 1.1 Libraries and the knowledge within

One of the earliest recorded tragedies in the history of mankind is the burning of the Alexandria library in 4000 BC. As Ted Hughes outlined in his poem, *Hear it again, the fall of the library* “brain-damaged the human race” (New Library, 2014). This type of collective knowledge was not achieved again until the 1200<sup>s</sup> in the monastic libraries of Europe. Over the centuries, the quintessential defining characteristic of libraries has been their status as places for information exchange where the vastness of humanity’s knowledge is stored. This was true until the inception of the digital information age in the 1980<sup>s</sup>. Knowledge, in its purest form, freed itself from physical constraints and could be found and accessed nearly everywhere. According to Edwards, if the Alexandria disaster is hypothetically repeated on a global scale by wiping out all of the world’s libraries, we would lose no more than a fifth of the world’s human knowledge. (Edwards, 2002)

This shift in the production and consumption of knowledge has irreversibly changed what now seems like a basic library function, a knowledge repository, to just one aspect of many. As an establishment, the library has to not only make knowledge available and accessible, but also stimulate the uninhibited exchange and reflection of information. Today, electronic information is accessible by everyone in a myriad of environments. The widespread of Wi-Fi hubs has turned all public settings such as the home, workplace, and school, into viable epicentres of knowledge consumption. While many view the internet as having discharged the library, it has not removed the justification or necessity for libraries to still exist. What has changed is that a broader focus is needed, where the contemporary library has to go beyond its existing programming of storage and the requirements that entails, and make room for the newfound functions enabled by the freedom of the information age. The public library needs to enable cross-platform availability to information while supporting its creative use. In the past this would not have been a pressing issue, when libraries’ programmatic intentions were purported towards storage. However, today and inevitably in the future, information will continually become easier to access and the key to the development of future libraries will rely in the spreading and use of knowledge. (Edwards, 2002)

The adage ‘knowledge is power’ in the context of this thesis has an important implication. Both from an empirical and socio-cultural context, knowledge is a product contained and made available in the library.

Early in their history, libraries were private institutions catering to a specific person, monastery, or academia. They began as adjunct buildings and introspective environments, with sacred auras they were closed off to themselves. Eventually, they grew into various formats such as exclusive collections for individuals in the upper echelons of society and colleges. Through the colleges, libraries transformed into places used by scholars for private research. With the advent of the printing presses, books could be mass produced and as a result libraries grew in size but their exclusivity diminished. The result was twofold; mass production reduced the costs of books while the libraries' social value increased. These buildings began to represent the power and potential of society. (Van Der Werf, 2010)

## **1.2 19<sup>th</sup> Century Renewal**

From a historical perspective, even though libraries had existed for centuries, it was not until 1842 when the Public Libraries Act in England allowed working class people to have full access to that type of institution. The library was part of an intellectual movement at that time as a physical representation of government's obligation towards education. Partly due to the booming of the Industrial age, mechanics institutes in the mid-1800's aimed at educating adult working people became established. The Municipal Corporation Act (1835) led to modern local governance, the Museum Act (1845) spurred construction in that sector, and the Elementary Education Act (1887) gave rise to compulsory formal schooling. (Edwards, 2002)

Thus, the Public Libraries Act was among many efforts to introduce better education and literacy into society. Civic libraries adapted from academic libraries their image as symbolic places of learning. Often tied to municipal art galleries or technical colleges, they invariably had the iconic plaques or inscriptions regarding the importance of reading or education. Unlike their academic counterparts, public libraries made room for publications such as newspapers or popular journals, and became public forums where the general public could gather. From the civic point of view, the public library of the late 1800's and early 1900's became a community node in a time of social and technological change. Individual libraries in England, such as East London and Liverpool, made room for literary and philosophical organizations. In the larger public libraries, people like John Ruskin and William Morris would often give lectures and talks in the auditoria of these buildings. Lectures, events, and scientific experiments would bring people in, further fostering intellectual thinking. (Edwards, 2002)

The aforementioned advances in the 19<sup>th</sup> century library changed it into a logical container of learning spaces, focal points, and book stacks. For the first time there was enough spatial requirement for the stacks and reading spaces to diverge into separately programmed areas. By the beginning of the 20th century the modern library as we know it started to take form due to contributions of people like Andrew Carnegie and the rise in higher education. It was also due to university libraries, which created and tried new approaches to designs that resulted in different architectural representations, unlike their more conservative civic counterparts in Europe and America. From a planning perspective libraries are still included in city plans, the only difference being that they are not regarded from a nationalist attitude, rather they are used as an economic tool in marketing cities and neighborhoods. Their physical appearance has changed considerably in the past 100 years, going from neo-classicist powerhouses to industrially built equalitarian houses of cultural diversity. Their interiors and systems of collecting and cataloguing books have mostly remained unchanged, with the Dewey decimal system of categorization still being the predominant method of organization. (Dijkstra. R, 2010)



## 2.0 Thesis Position

If today's libraries need to be considered as high tech gateways to information, they need to do so as they did a century ago through books, newspapers, and lectures to keep up with the pace of a rapidly changing information landscape. This cannot be achieved solely through electronic and virtual presence. If the library's influence is being disseminated under the 'digital effects' of computers then this brings added importance to the architectural makeup of today's new libraries. The shared knowledge landscape that the digital affords needs to be reflected in spatial configurations that go beyond public lobbies and dedicated reading rooms. This consideration has just as much effect and social importance as the computer's electronic interfaces since the architecture needs to bring the focus back to the library's functions of identity, community and place.

If libraries are one of the main personifications of the politics of knowledge and the dissolving of closed sources of power, their response to the emergence of vastly accessible electronic data needs to be considered with high regard. Digital information technologies are proving to have as great an impact on libraries as did the printing press. The norm of the book as the main 'format' of library knowledge is rapidly changing both in terms of cataloguing and formatting. While this is a profound transformation in the nature of the library, it only affects its programmatic character and does not change its cultural status. From a social standpoint, the public library still has the same relevance as a place where the community interacts, and where learning for members of all ages is still very active. Similar to other public venues such as airports, museums, and stadiums the library represents many roles and in the process surpasses its utilitarian functions. Even through another hypothetical exercise, where the book is erased for its digital counterparts, the library as an establishment would still exist as it is the vessel that fosters people together in the mutual pursuit of knowledge. The perception of the library needs to change, both from a programmatic and architectural point of view, to reflect it as a place for people and not books. Today access to and creation of information can be achieved through various interfaces, be it that of the computer, tablet, cell phone, web presence etc. These digital means of access should not be seen as what will spell the end for libraries, but as the tools needed to establish social contact and context. (Dijkstra. R, 2010)

Molz argues that the aforementioned shift in the ways we produce and consume information gives architects as well as library commissioning bodies the task of applying alternate programs for the changing functions of public libraries. Contemporary public libraries do not just catalogue books, records, and journals. They also provide access to the Internet, computers, educational programs, exhibition spaces, cafes, recreation facilities, and other community-oriented amenities depending on the urban context they are situated in. The library has indeed become an extension of the public domain, an institution that encompasses various multifaceted programs under the same roof. Therefore, the public library can still be considered symbolic of the power and potential of citizens and is still a place for people to come together and enable the creation of cultural identities. However, today it is not the only establishment to do so. This intellectual empowerment is occurring outside the walls of the library. In a continuously marked and marketed public domain, many of the same amenities are independently available. Perhaps the advantage here is that libraries have opted for the agenda of becoming concentrations of public spaces, amalgamating the outside world within their walls. With the blurring of their physical and metaphorical boundaries libraries have ventured beyond their physical presence through the interconnectedness afforded by web browsers, on-line retrievals, and other new media. (Molz, 1999)

Architecturally this puts public libraries in a new paradigm shift where their walls are turning into a physical formality in the face of the new perspectives offered by these new mediums. The technological leaps from the printing press to the e-book have undoubtedly made the library more important. The public library has accommodated all of these leaps to information access and delivery in a variety of ways over the course of history. The printing presses developed in the second half of the 15th century did not just widely spread books but created a demand for libraries to house them. Knowledge was no longer relegated exclusively to a handful of individuals but was made available to the many. This pivotal shift served as the underpinning for the Renaissance and Industrial Revolution, made possible by the symbiotic relationship between the book and library. (Van Der Werf, 2010)

What is different today is the exponential growth of the digital world and its global reach at the social, political, and economic scales. The shift from book collections to electronic ones has some profound implications for library design. Are reading rooms relevant anymore in increasingly open libraries? Do the golden rules of silence and abstinence from cell phone usage serve any purpose in increasingly team based electronically aware learning environments? Is there a difference anymore between social and study spaces and what is the right balance between the two? If the future library is to integrate the digital in increasingly innovative ways will rooms even be needed or will the program lay



in an open marketplace of digital interaction? Is open space more important than specifically designated rooms, or given the socio-cultural pull that libraries must not lose, is the furnishing of cafes just as important as the contents of the library's collection? (Edwards, 2002)

This thesis will attempt to engage itself with this discussion. It assumes the existence and need of the library, albeit a much more widely focused one in the future. By using digital means as a tool and metaphorical lens, current issues and discrepancies can be put in perspective. The library can now be discussed throughout the physical and digital public domain, enabling it to exit its traditional setting and even become a self-organizing entity. Organizational strategies (enabled by a combination of hardware/software, social, and architectural systems) can now be applied to libraries, increasing the availability of information and improving social coherence between users and librarians as well. The intent is to focus on the role that the public library plays in contemporary society and to give a clear perspective on the potential that the library can have in the future. As Van Der Werf puts it:

“Knowledge is information, whether it is raw data or poetic narrative. In order for it to exist, it must be compounded by communication, and the ideal equalitarian agent for this task is the public library. For knowledge is the library's commodity, and as a result it attracts producers and consumers of knowledge...” (Van Der Werf, 2010)



### 3.0 Future Library

Similarly to how modern art galleries or museums have been laden and intertwined with cultural value regardless of the collections they contain, the library is a building that increasingly exists autonomously from the printed word. As previously mentioned, the form the library will take is now the subject of interest as much as its change in content. Is this new iteration (used in the context of a library that is also and not exclusively digital) a parallel to how electronic networks work? In the face of this glutinous amount of immediate access to a high infinite amount of data, societies are facing a potential loss of focus in viewing the library as an essential building type. The strains introduced by digital information systems have seen libraries change and adapted more in the past few decades than in the past couple of centuries. While the book and journal stood as the primary sources of academically peer reviewed sources of reliable information, this reality is starting to change. As the inception of this transfer started in academic libraries and their networking for ease of access to various academic materials, this system of approach has trickled down to public libraries at a much faster pace in recent times. The boundaries of the public library have changed, computers and digital interfaces now command as much space as they do attention in a library. As digitized data retrieval and collection systems invade spaces once reserved for books, the library changes in character. By their sheer presence, spaces become more open and interactive turning the library into a digital marketplace and its users into navigators of electronic systems. Books may not be removed from the picture but their role changes. They become a secondary point of contact to the interactive digital displays that guide the flows of knowledge acquisition in different directions. (Worpole, 2013)

Librarians have been forced to adapt to these shifts as much as the buildings they work in. They too have to navigate and adapt to the new information technology systems their users seem so keenly attracted to. Their roles will change to those of guiding and managing both the electronic and traditional modes of content delivery. Even the terminology of 'library' has seen its share of revisions. Coined in the academic circles the term 'learning resource center' has been defined as synonymous to libraries. This title highlights the significance of all the resources used in the library: electronic and print, learning vs. reading, and 'center' as opposed to building. (Edwards, 2002)

Future libraries need to retain their function as community nodes, but need to be designed as more welcoming and accommodating to casual users and non-readers. Information technology will not spell the end of the public library. If anything it will liberate it into providing new kinds of public services, attracting potentially new audiences. This new function will serve as a learning

channel that enhances academic learning while still supporting life-long learning. A wide variety of consumers may use these enhanced functions as a means for technological skill transfers, turning the library into an access point for technology migration to society at large. These views lead to a different type of library in the 21st century. If a new generation of libraries is to emerge, it will need to push at the frontiers of design, taking the challenges and freedoms afforded by information technologies, and the needs of communities as the agenda for a fresh approach to library architecture.





## 4.0 The Library and Information Technology

### 4.1 Information Infrastructure

Historically librarians have contended with informational content, which until recently comprised artifactual form, be it paper, vinyl, or even film. How that content was packaged, including the original act of authorship and the activities dealing with publishing and distribution, had tertiary importance to whether libraries acquired that material. While issues of readability and physical qualities of books were taken into consideration, what was most important was the intellectual value of said books to the libraries' collections and their contribution to their users. With the information age, this process has partly shifted in that information is now both content and process.

Molz and Dain argue that while technology is not the only driving force in public libraries it certainly is a dominant one. Overall, while libraries are moving forward in using it, they seem to be taking a holistic viewpoint, trying to integrate new technology with classic services. They are, however, critical of the views of computers and electronic information as being new tools in the service of old purposes. While not the only force operating in contemporary culture, electronic technology is an unavoidable transformative force that has affected the ways businesses operate, products are produced, and how people lead their daily lives. In the context of libraries it brings forth previously unavailable forms of communication; new ways to store, think about and acquire information, as well as new ways to serve individuals and communities. Technology needs to be seen as more than a tool and any nostalgic attitudes for the old days of card catalogues and endless rows of book stacks dominating the library's landscape are a thing of the past. All the same, Internet access and online terminals on their own do not have enough merit to replace the defining values of the public library. As a trademark of a democratic society, the public library still stands as an open, community-based establishment enabling the public's right to knowledge and a steward of the free expression of thought. At their very core libraries still stand as multifaceted, democratic, single-source and consultation centers for all types of free information, learning, cultural enrichment and entertainment for people of all ages and denominations. Printed materials are still part of the bread and butter of libraries as they continue to be produced (and in demand), moreover not all of them will be in the near future, if ever, digitized. As physical and intellectual presences, they still hold great symbolic and utilitarian importance in today's culture. (Molz, 1999)

The breadth afforded by the digital information age for libraries among other public venues is not a new phenomenon. In the age of print, the library was never the exclusive source for publications. Concurrently bookshops, print subscriptions, book clubs, and more recently big bookstore chains also existed. Molz and Dain argue that big book chains are not yet as ubiquitous as public libraries, and they may never be. After all, they are profit-driven businesses, offering mainly popular best sellers and relatively limited stocks of non-mass-market materials. Libraries have a distinct advantage here as they retain innumerable materials outside the commercial book marketplace that people could have an interest in and that have cultural and archival value. This unique repository of alternative forms of information serves as an open resource serviced by knowledgeable personnel and thus has little competition in that regard. (Molz, 1999)

## **4.2 Being Digital**

Nicholas Negroponte's "Being Digital" reserves its own section in this thesis as it analytically breaks down the history of various digital media technologies, many of which Negroponte himself theorized in developing during his tenure at MIT's media labs. He analyses several technologies and throws in his predictions on how they will evolve or what future technologies they might produce. While the publication is 18 years old, Negroponte achieves an almost prophetic view of current technological trends. These include the digitization of information sources (newspapers, entertainment, or sex), the replacement of material forms of information delivery (atoms) by a digital equivalent (bits), the interactivity of new technological interfaces, and the concept of virtual technologies adapting to their user's behaviours in filtering information delivery. It is without irony that the introduction to his book is entitled "The paradox of a Book". (Negroponte, 1995)

Considering the premise of this thesis, Negroponte already saw the exponential and irrevocable change from atoms to bits with regards to information delivery. He points out that when digitized, information is not static but becomes instantaneous, able to move at the speed of light, and most importantly universally accessible. He anecdotally points out to how an encyclopedia's breadth of general knowledge is superimposed on individual books and publishing that go in depth on specific topics. In the world of atoms, or in this case that of a library bookshelf, physical limits exclude the possibility of having both breadth and depth in the same publication, short of it being a mile thick. In the digital space, issues such as depth and breadth disappear as users (both readers and authors) can switch freely between generalities and specifics. This concept of optionally being able to find more information on any given set of data stands at the root of what he coins as hypermedia. He describes



this difference by referring to the enclosed final form of printed information, relegated to the confines of the pages of a book, journal, or newspaper. In the digital realm, information is not limited to three dimensions. It can include a multidimensional system of secondary data that leads to further elaborations or arguments, which can be sought after or ignored. Much like the keyword searches done today on digital search engines, the delivery method is always one of information about information. Just as how a book can be indexed with a card or an underline, the digital revolution affords hyper linking of all the words, phrases, and ideas with ancillary information in what can be described as an endless neural network of information. (Negroponte, 1995)

In addition, Negroponte saw the escalating field of multimedia and technology much in the same light as architecture; bridging the gaps between technology and the humanities, science and art, right and left brain. Personal computing moved computer sciences away from technical imperatives to more ubiquitously creative ones. Further parallelisms to the library can also be seen in his attitude towards the pulling and pushing of information. Using media companies as an example he points out that over time, their filtering processes in the selection of articles will become void and null. The users, and their digital presence will be the ones that will “pull” information and directly filter it without the need of a content-mediating body. The importance of the future library is quite relevant in this discussion as it has the potential to become the physical and digital marketplace of the global information highways. (Negroponte, 1995)

Another precise prediction of Negroponte’s was the power that the internet would avail to information systems. Both as a model and metaphor, the World Wide Web can be interpreted as a massive and widespread global network but also as an example of something that evolved over time with no apparent designer or preconceived structure in charge. The number of internet users worldwide today stands at about 2.4 billion, a 566.4% growth from 2000 (World Internet User Stats, 2013).

This community of users and producers will be in the mainstream of daily life. Its demographics will increasingly resemble those of the world itself. This single best application of these vast networks is communication. Negroponte argued that it is less about information and more about community. Interestingly he used a library to convey this idea: “The information superhighway is more than a short cut to every book in the Library of Congress. It is creating a totally new, global social fabric.” (Negroponte, 1995)

An additional notion that applies to the library as a place for learning is highlighted in Negroponte's critical view on the early use of computers in childhood education. He leads to the notion of using computers as tools children could use to learn by teaching themselves. He observes the interactive and exploratory nature of computer interaction in self-administrating methods of learning. Learning by doing became the status quo rather than the exception. If children can play with information, even if dealing with abstract subjects, the material adopts more meaning. Children using computer software while having freedom of choice in researching ideas and topics may be able to learn physical and logical principles their parents learned in college. Negroponte points out to research that this constructionist approach is an excellent way for kids to learn, across a wide range of cognitive and behavioural styles. The World Wide Web in this instance provides a new medium for reaching out to previously alien information to find knowledge and meaning. Even computer gaming is included in this picture; as the complexity of games grows in tandem with technology, children are becoming more adept at dealing with ever real social and moral scenarios. While the efficacy of games in educating young minds is debated at length, what's become obvious is that the dominant forces in the digital education of young minds are not social, racial, or economic but rather generational. Whether it is electronic games, apps or complex programs, they all teach kids strategies and demand of them planning skills they might find useful in life. The tech savvy can now be generationally divided in the young and the old. While many intellectual movements may be driven by national and social forces, the digital revolution's ethos and appeal are universal. (Negroponte, 1995)

The last technological implication regarding this thesis from the list of Negroponte's predictions lies in ubiquitous computing. Having come from an architectural background he observed that valuable architectural problems fed directly into computer designs but the opposite was not true. At the time, most intelligent systems lacked the ability to sense human presence with the scaling up of computers creating user ignorant environments. The ubiquity of computer presences would be driven by various and increasingly interconnected computer processes. (Negroponte, 1995)

### 4.3 The Skin of Culture

Derrick de Kerckhove's "The Skin of Culture" is another substantial publication with relation to this thesis as it looks at how electronic media have extended our nervous systems, bodies, and psyches. A contemporary of Negroponte he poses a Canadian perspective, deepened by his collaboration and influence from Marshall McLuhan's insights. He rightfully describes the web as a network of networks, allowing for precise narrow casting under the control of the user. Unlike previous communication technologies, its invasiveness is minute and dependent on the user. He takes issue with the web being defined as an information super highway, considering it instead as a brain, a collective neural network that never stops working or producing information. The internet is now powered by its own subconscious, compromised of entirely too much data for all of it to be filtered at any conscious level. This brings about the need for information filters. New forms of collective intelligence would arise on filtered information that updates itself. As with knowledge gathering systems such as a library, they can be adjusted to individual needs through hypertext, search indexes and networked integrators. (De Kerckhove, 2001)

So why have libraries had such a hard time in adopting these processes? De Kerckhove argues that every major technology, prior to achieving saturation in a culture, has to undergo two stages: first to be in absolute evidence; and second to be internalised to the point of it becoming invisible. An example of this is illustrated in Canadian cities where electrical poles with outside wiring are being replaced by much more expensive underground wiring systems. This trend in discretion can in some instances be the result of a self-regulated strategy, but also because baseline technologies work best when they remain unquestioned and undetected. In the case of the library there is still much to be achieved for the latter to happen. The upside of this is that a psychological change will take effect from the development and mass consumption of digital technologies. As people become accustomed to digital information being thrown at them from their early kindergarten years to the workplace, they will realize that electronic technologies are not merely external improvements in their immediate environments, but extensions of their intimate being. When design becomes the standard interface between thinking and doing, the activities dependent on doing may become appendages of thought and feeling. As societies, we are always (directly or indirectly) realizing that the intelligence of the World Wide Web with which we are constantly intertwining our lives is an extension of our intellect and being. (De Kerckhove, 2001)

"In this electric age we see ourselves being translated more and more into the form of information, moving toward the technological extension of consciousness" (McLuhan, 1994)

How does design then play into this? De Kerckhove looks at design as something that envelops a technology, representing it and promoting it whether directly or indirectly. However, in a broader sense, design plays a metaphorical role, translating functional benefits into sensory and cognitive ones. It finds its form and setting as an overtone, an echo of technology. Design is planned, and it conveys an influence of the relationship between the human body and its environment as it is modified by technology. If technology comes from the human mind then design makes sense of it. By perceiving the particular values of design, the mind learns to understand the postures of our extended bodies. Design will quickly advance from a reactive to a more proactive stage of operation. New technologies should become the object of design, as opposed to being at the source of design. It will find more rewarding results in the exploration and creation of patterns of interfacing than the production of objects.

Perhaps the most relevant point that De Kerckhove draws out in his analysis of technologies was that language was our first technology. Information processing starts with spoken language. It still is the predominant code available to humans and will remain the primary one for the future. There is a deep intimacy that linguistic expressions retain within our biological constructs. Language develops within us and helps us to form thoughts that let us discern reality and survive in it. The better grasp we have on language, the better equipped we are in recognizing, understanding, and living in the environments that make up our reality. The evolution of intelligence goes hand in hand with not only the evolution of language, but technologies that supported and processed it, first among which is writing. Through writing, verbal utterances achieved enough consistency and reliability for linguistic coding to develop beyond common usage. One of the main effects of writing language has been to detach human vocals from their speakers and allow them to be transferred and changed. In earlier exclusively oral cultures language was in control of people's behaviour, with writing the opposite became true. Writing gave civilizations the ability to store, expand, and manipulate language as a means of representative and practical control over reality. It is writing and the ability of moving messages that made possible certain modes of social organization, codes of law, religion, and behavioural patterns. The refinements of the Greek alphabet modernized the state of writing from that of a memory tool to that of a tool for thinking. Human intelligence was absolved of the burden of recalling to be claimed to innovation. Through recording and archiving relevant information, any writing system could potentially introduce and support varying degrees of a collective historical consciousness. What the alphabet accomplished for the Greeks, Romans, and all civilized empires was to provide every reading citizen with a personal grasp on reality and intelligence. Reading and writing become the fundamental conditions for the privatization of the mind. It is of interest to note

at this point that if we were to substitute the concept of the alphabet with the World Wide Web (as it is perhaps the most global language) De Kerckhove observations would still ring true. Still, the objectification of knowledge, stored in books, dictionaries, universities, and libraries solidified a common, public, social and mental space for the free evolution of individual contribution. (De Kerckhove, 2001)

The jump to the computerization of information happened with the inception of the telegraph. This was the first information processing technology to affect the temporal and spatial constraints of information delivery to instant communication. This introduced new possibilities for the spreading and processing of human intelligence. The telegraph was essentially the link between language and computation. The codification of twenty-six letters into three electrically conductive signs was quite radical as it established a common carrier for networked intelligence. This continuity between language and digits is reflected in the universal computing machines that individuals use today. Until the inception of neural networks, all computer operations have been based on the same basic principles of fragmenting, de-contextualizing and recombining information. Computers have introduced a myriad of relationships between people and interfaces. They mediate between the nervous and external processing systems: they serve as interfaces between the psyche and the technical. The purpose of computerization is to extend to the digital environment the same kind of control and observation relations people experience within themselves. Electronic mediums are becoming midway environments, having access to the intimate realities of people's psychology and providing a connection to the outside world. They can socially mediate as continuous extensions of the powers of imagination, concentration and creativity. (De Kerckhove, 2001)

News and reporting are still interpreted as processed information. The mediating bodies that deliver news are recognized as neutral entities for storage and distribution, not as information processors. This view comes from our literate mindsets using print as the standard information delivery medium. In print, information is already complete, the reader is the processor. However, now that machines are processing information for their users, more attention needs to be paid to the connection between media and its readers' perception as independent consumers and producers of information. Systems of information processing, such as computers, are appendages to some of the primary psychological values of our own minds. De Kerckhove defines them as psychotechnologies. They include 'live' information processing apparatuses and networks such as the telephone, radio, television, computers, satellites, etc. Since their relationships change with the social fabric, they also change or modify psychological features, particularly those dependent on the interaction between

the psyche and machine. At its basic level, a medium makes individuals respond physically to its way of working. However, people also respond psychologically, by using memory or imagination, depending on whether they are i.e. reading or listening. At a deeper level, exposure to predominant media such as books and computers, can have secondary effects that go beyond their exposure to them, conditioning users both from social and psychological standpoints. An example of this conditioning power is shown in public polls. A fundamental aspect of this interaction between producers and archivers is accurately reflecting the opinions of a given community sample. Psychotechnologies come into effect when those same polls shape opinions or present views that didn't exist before. Statistical results have like minded effect on public opinion since they bring to the forefront (thus promoting) popular responses over contrasting ones.

“In a culture where the means of making up one's mind are given less weight and time than those which make up the collective mind, it is easier to let the majority hold sway. This is one of the trade-offs between book and television culture” (De Kerckhove, 2001)

#### **4.4 The Library in the Google Age**

Throughout the literature reviewed, the comparison of Google and libraries as information providers of the same relevance has been heavily criticized. Authors like Niegard and Gordon note that an internet search engine is unable to replace high quality, locally aimed cultural and knowledge communication. As long as libraries assign the necessary resources and leave room for adaptation and expansion; the age of global information society, where larger amounts of information, knowledge, and cultural services are distributed digitally, can only push the library forward. The library building is also changing from a book and shelf dominated space to a broad cultural and knowledge bearing holistic library, more so focused on the patron's stay in the library and them having equal access to both physical and digital resources. (Gordon, 2007)

Aside from books, there are various other media, functions, and activities offered in modern libraries. Improving on these services does not solely depend on the provision of access to websites and online catalogues. Architectural design plays a role in the careful consideration of design opportunities available to accommodate new digital technologies. It can enhance the ways users utilize the physical spaces of the library in order to create new experiences and services. The application of intelligent information technologies and the integration of technological media formats in a physical environment can be overwhelming. However in recent years these issues have been dealt with in a wide variety of types of architecture. The advantage here is that they are predominantly applied in open public institutions, a large part of which is comprised of knowledge and communication based establishments

such as libraries. Globally, libraries are being discussed and designed with these opportunities and challenges as a focus. The discussion has shifted to where the qualities of libraries are interpreted as synonymous with the knowledge society. Niegard also highlights three critical conditions necessary in the rethinking of the physical structure and layout of new libraries: user's new media habits and behavioural changes, shifts in the library's resources and tasks; and the automation of work processes, including the growth in self-service facilities. (Niegard, 2011)





## **5.0 The library and the Community**

### **5.1 Libraries Today**

Anybody walking into a library building will have to get acquainted with the space and its layout, but it is hard not to feel at home. While collections may differ in speciality and emphasis, the core is analogous. Proportions of print and non-print materials can be different, but for the most part, books, magazines, newspapers, and digital media (in the format of cd's and audiovisual materials) can be found in most libraries. Children's spaces are offered in some establishments and magazines and newspapers may be stored in separate rooms, but current issues will still be on display for browsing. Librarians are also akin to one another: they have a fair understanding of their libraries being agencies giving the public the means of acquiring information, education, aesthetic experience, and entertainment. Therefore the traditional public library as a popular, nonpartisan, community-based, and within real (not virtual) walls still carries significant social relevance. Molz and Dain compare this contribution to social scientist Robert Putnam's concept of "network civic engagement" in that it binds people to communities and promotes a sense of fellowship, civic involvement, and democratic living. As a civic space, dedicated to cultural and educational purposes, the public library reinforces social cohesion in a progressively fragmented and market-driven culture. (Molz, 1999)

### **5.2 Communities**

Living in a symbiotic relationship with the demographics of their communities, Molz and Dain also view public libraries as having continuously echoed trends in society at large. They can be seen as microcosms of the macrocosm, be it that of social structures, economic conditions, political currents, and intellectual and cultural life. (Molz, 1999)

Today public library Web pages are inclusive of all types of community and regional information from directories, municipal services, cultural institutions, calendars of events, job banks, availability of child care to city network and destination maps. While this type of information has been previously made available in a variety of formats, its packaging and promotion in a digital format and their extent is new. Through its digital presence, there has been an unprecedented expansion of digital civic information. There are several goals of presenting community information: to provide civic information for practical personal use, to inform and enable more informed participation in civic affairs, and to encourage a sense of community. A present-day trend in library practices is to leverage resources and capacities to reinforce community usefulness and status by partnering with local community organizations

and institutions to serve a variety of needs, most notably through electronic information systems. This approach reflects the growth of community oriented thought, new community networks, and informs the attitudes of foundations and groups interested in public libraries. (Mattern, 2007)

Libraries are more than just distributors of community information. They serve communities as cultural and education centers, as institutions of knowledge, and by all accounts the public seems to expect them to continue doing so. Reading lists are still being issued (only now in both print and digital format) as well as notices of educational and cultural programs, exhibitions, and services. These classic activities now have even more relevance when empowered by electronic means. As more refurbishments and new libraries are being built they are laid with increasingly new digital terminals which need to be designed in a way to sustain and enhance library services. These include: children's reading programs, helping teens with homework, assisting senior citizens in acquiring information, sponsoring literacy tutoring and ESL sessions, plan exhibits, poetry readings, art programs, and film series to name a few. (Mattern, 2007)

### **5.3 Branch Libraries**

Another reason for the relevance of the library is that in the future, people will need to upgrade or learn new skills many times over the course of their lives. Education, itself evolving with the paradigm of information technologies, will no longer be a one-stop shop cycle, but a continuing process of adaptation and self-empowerment that will accompany people throughout their lives. The CABE report also looks at libraries in the 20th century being spread out through the growth of branch libraries. Often regarded as neighbourhood or community libraries, these institutions have come to have a distinct character, usually providing fewer services, but offering a much needed social and intellectual role. As towns and cities expand, many of these buildings lack the flexibility to adapt to meet the evolving needs of their communities. Therefore, future services have to take into consideration the building component with as much regard as the content offered. Branch libraries, perhaps more than their central or national counterparts, are more in sync and aware of the cultural needs and interests of the communities they serve. In particular locations, libraries can be represented with specific programmes: be it life-long learning centers, cultural marketplaces, agencies of public information, or community facilities and meeting places. The concept of a one size fits all approach will not work, especially when dealing with branch libraries. Each library iteration will need to prioritise its services and character for its relevant set of patrons and users. Libraries as typologies are not generic buildings. Much like schools and town halls they also represent particular values that endure over time.

Since significant elements of current library designs take many of their cues from retail culture, including location, then even the lines between central and branch libraries have become quite blurred. (CABE, 2004)

#### **5.4 Digital Community**

Horan looks at the re-envisioning of the public library's presence as a component of the civic layer through its recombination with digital technology to create a new form of civic and research institution. He observes that a frequent theme of digital place design is the possibility of using technology to create connections within local communities. Public spaces (real and virtual) offer perceptual and functional meeting opportunities for friends and strangers alike. This strand of "recombinant design" as he calls it, gives emphasis to the importance of both real and virtual environments as meaningful places. The duality of these unifying connections can change the sense of place into a sense of community. The use of digital technologies to reinvent public institutions as the library can create hubs of community activity in an increasingly fragmented approach to urban design and planning. The challenge rests on institutions being able to create new connections with schools, museums, and other civic entities in order to improve local interaction. The possibility exists to create new physical and electronic agoras that will diminish the potentially isolating impact of computer-based work. (Horan, 2000)



## 6.0 Case Studies

### 6.1 Vancouver Central Library



Fig 6.1-1 Vancouver Central Library Exterior Volume

Moshe Safdie's Vancouver Library square presents a classic public setting which is also equipped with a variety of high-tech amenities. Critics and supporters aside, Safdie's design was unprecedented. It was meant to act as a civic landmark, a significant public statement, and an eye-catching structure with a strong civic presence. Taking inspiration from the Roman Coliseum, the project combines traditional public library functions with both electronic and public space objectives. Physically, the coliseum like structure is located adjacent to an airy, open street like promenade, viewable from the largely glazed building. The elliptical transparent wall and the flowing public space link the exterior plazas on the north and south sides of the building and serve as its fundamental design elements. Sitting back from the edge, with large open space around it, the building creates a piazza as it becomes a focal point for the district. Leckie quotes Safdie as saying about the library: "It bridges a kind of high-tech futuristic experience at the same time as it provides the comfort and familiarity of something that is both ancient and traditional"(Leckie, 2002)

At the time of the Leckie's journal publication, the library had 2,240,000 (7,800 per day) annual visits with over 380,000 library cards in use, a figure equivalent to 70 percent of the population of Vancouver. Visitors checked out over 8 million items, with youth under nineteen responsible for 26 percent of items borrowed. (Leckie, 2002)



Fig 6.1-2 Vancouver Central Library Interior Piazza

From a digital standpoint, the library is equipped with electronic access terminals, included in several stations specially reserved for access to the local community network. A vertical fiber optic backbone provides the means for connection to the electronic world, while the promenade and adjacent open stairway provides a physical backbone for open-ended space. (Horan, 2000)

## 6.2 Seattle Public Library



Fig 6.2-1 Interior View of the Building Skin



Fig 6.2-2 Library Exterior

In contrast, Rem Koolhaas's design for the Seattle public library draws on virtual architecture to arrange both physical and electronic materials. The building is divided into five thematic platforms, each with a specific character: 'parking' at the bottom, 'store' at ground level, 'assembly' at the third floor, followed by two floors of books and administration. The in-between spaces are categorized as trading floors where the interface between the platforms is organized into spaces for work, interaction, reading and play. From the fifth level a continuous spiralling boulevard, designed to accommodate collections organized in the Dewey Decimal System, leads a reading room formatted as a reference space while simultaneously offering views over the city. From a



user perspective the reading room, where patrons are likely to stay longer is located further up in the building. Those attending classes, borrowing materials, accompanying children, or meeting others will find most of those services closer to the ground. Due to its size and scope this library manages to provide the appropriate space for all the necessary information access users might need. It is one of the more rare examples where a hybrid method of cataloguing (both Dewey and book tagging) has been given to different collections. (Worpole, 2003)



Fig 6.2-3 The Library as a Tech Gateway

Niegard sees the Seattle Central Library as an important example of a user magnet. Created as a mega sculpture of glass and steel, it has garnered global attention as an example of 21st century library. Despite motivations for a new and different type of library concept, it is also a traditional book institution. (Niegard, 2011)

Worpole also observes the same duality contrasting the character of the diamond-shaped steel and glass exterior to the indented edges on the interior producing a range of lighting conditions offering both shade and direct sunlight. It is one of many new examples of the new trend toward locating libraries as urban centers in the past. In addition, this library creates an urban space for everybody in the city center. Structurally it is designed to attract attention as a distinct iconic building that provides a place for a modern library service and cultural as well as social meeting place for citizens. (Worpole, 2003)

Treating the library as a theatre where information is displayed in a public forum, while at the same time preserving the necessity for places where thinking, discussion, and reflection can happen is paramount to creating a library that functions with the demands of 21st century users.

### 6.3 Hjørring Public Library



Fig 6.3-1 Library as Play Space



Fig 6.3-2 Circulation Ribbon



Fig 6.3-3 Children's Play Area

Niegard regards the Hjørring public library as an experience library, created to focus on user needs and preferences, rather than material collections and expanses of shelving. Situated in Hjørring in Denmark, the library is located on the first floor of a new shopping center. The popularity of this library is not due to its exterior architecture, but rather from its unique interior design and layout.

In its design methodology, the Hjørring library emphasizes two central concepts: the third place and the human urban space. The third place concept highlights the importance of informal public meeting places such as cafes and other “hangout” locations (as opposed to home and work, which constitute the first and second places) in terms of the development of local communities and democracy. Niegaard also discusses human urban space in terms of using library planning to create meeting places that are comfortable to be in. The experience and arena library in Hjørring was created by utilizing a sculptural “red thread” throughout the colourful library, producing a unique and diverse library environment, enforcing its status as the town’s cultural meeting place. The interior is arranged as a single-room space containing a variety of smaller alcoves and various discretely positioned IT facilities. The design and construction adhered to three main principles: culture and experience, lifelong learning, and the patron’s stay in the library, regardless if they are there to borrow materials; find information, literature, or music; meet with friends; or just relax on their own. (Niegaard, 2011)



## 6.4 Flybits

As mentioned in the section 4, the implementation of the digital with the response of the physical environment has important implications when it comes to the spatial design of modern libraries. Architecture has faced the issue of using technology only from a parametric and computational point of view without being able to similarly harness the power of context-aware computing; the only extensions of this being mapping and GIS applications. An example that encompasses Negorponete's philosophy on ubiquitous computing, having the potential to be applied to designs, and therefore public libraries, is Flybits.

Hailing from the Ryerson Digital Media Zone, Flybits is a software company that focuses on designing and developing cloud-based, context-aware mobile solutions that are adaptive and scalable. Flybits FARE (Flybits Activity Recognition Engine) has created systems that allow different establishments to build intelligent and adaptive applications within existing physical environments. FARE allows technological systems to input their functional directives and create new protocols for mobile applications in different situations and locations. Essentially this software suite allows personal mobile devices to sense their user's presence, both physical and digital, within an environment. This in turn enables various digital features within that given environment to specifically respond to that individual. It addresses issues of information overload and provides personalized and relevant content to that user. (Flybits, 2013)

## 6.5 End of Shelving-Dominated Library

As previously mentioned, patrons do not just visit libraries to borrow materials anymore. Therefore, there is a responsibility of professionally presenting the growing amount of digital materials now available. The transformation needed to achieve this must also include a rethinking (or redesigning) of bookshelves. They too will not totally disappear, but new design strategies suggest there will be less space and area between them. New demands on the design and layout of library spaces have to be put in place for the library to maintain and strengthen its impact in the knowledge society. Almost all demographics and generations have incorporated new electronic mediums in their daily lives; therefore, this familiarity with the digital landscape will unavoidably influence the future library. The discussion and opportunities for the framework of displaying digital and physical media are still a very fertile ground for design opportunities as they are still very dependent on new technologies and creative applications that go with them. (Niegard, 2011)

## 6.6 The Microshelf

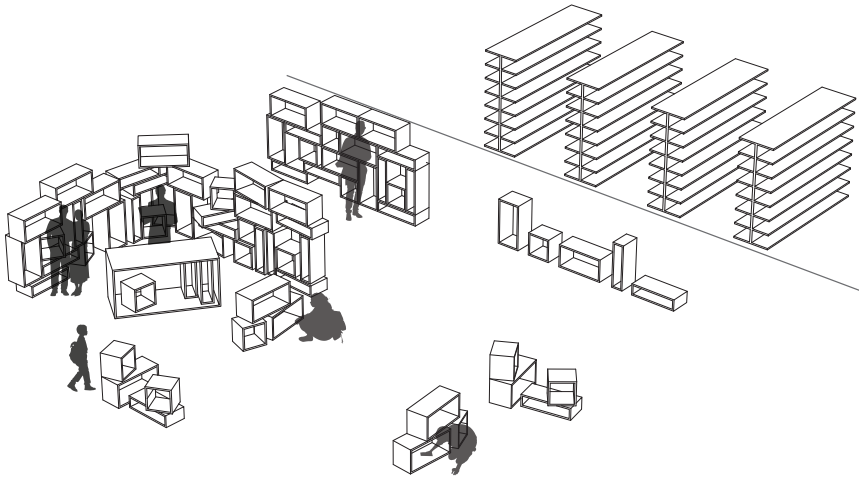


Fig 6.6-1 Microshelves vs Traditional Shelves

In their publication “The Learning Jungle” Rients Dijkstra and Jason Hilgefort argue for a conceptual approach that allows for the transformation of existing libraries as well as the designing of new ones of a different nature. They look at the agency of the book and argue that the future library must preserve the book (even as it faces the advent of new digital media) while allowing it to step back as the primary medium in the storage of knowledge. In this iteration books would be given a new functional meaning, forming a vital background to the plethora of information afforded by growing digital information. The first initiative in re-evaluating the book is to free it from the bookshelves and any predetermined order, such as the Dewey Decimal System. According to them, the long standing claim that bookshelves have over spatial organizations of libraries has hindered the development of much needed flexibility in the dispersion of additional programmatic functions in the library. They point to this lack of flexibility in the book being tied to the shelf, making it difficult and confusing for both patrons and librarians alike (at times) to find information. This is an added pressure especially since most libraries physically separate their printed content from their digital access stations. It is an issue that libraries worldwide are facing. Thus far there has been little effort in integrating and treating the digital section of materials with the same regard as books. The ease of access to digital mediums is undeniable, computer terminals are embed with all the functions afforded by software and the World Wide Web. When it comes to generating, producing, and archiving information, books will have an uphill battle with the tantalizing speed that computers, with their knowledge access and two ways interaction, can provide. As with the intent of this thesis Dijkstra and Hilgefort aim at finding a way where the distinction between books and digital media becomes flexible and almost indistinguishable. (Dijkstra. R, 2010)

Through RFID (Radio Frequency Identification) tagging, tags can be placed in books and other objects, essentially rendering them trackable using radio waves. While not a new technology, its application in libraries has great potential. All of a sudden books and printed content are imbued with an additional layer of data, having a digital presence, they can be managed through various digital interfaces (such as the previously mentioned Flybits).

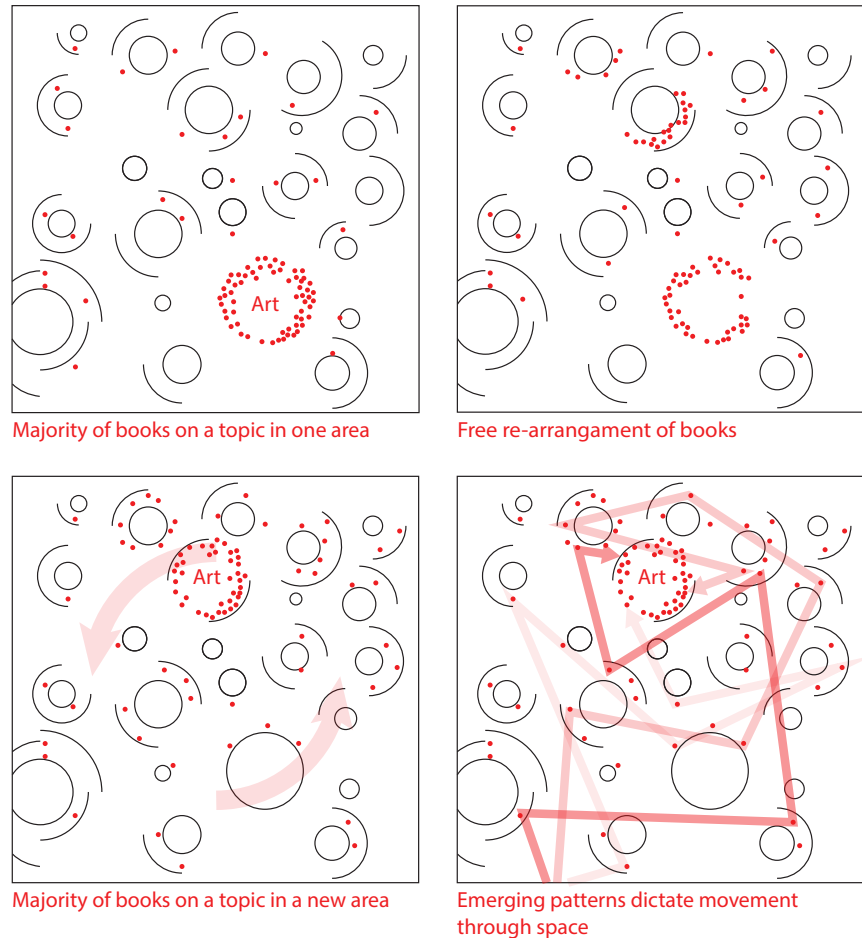


Fig 6.6-2 Spatial Configuration Potential of RFID Tagging Technology

This avails new ways of organizing media and the library itself; one that is more self-organized and adaptable, allowing users to change the location of the information freely, therefore, changing the way knowledge organization is perceived. Since the regular bookshelf in this new system becomes redundant, Dijkstra and Hilgefort introduce the concept of the micro shelf. Micro shelves allow for the housing of various physical media formats, being flexible in both storing and space allocation, and can be changed and configured by the patrons and the spatial requirements of the library spaces. They can be assembled traditionally, but also allow for users to configure their own spatial arrangements.

Used in combination with RFID tagging the organisational layout of the library can be visualized both physically and digitally, making for adaptable and flexible environments that can change as the library's needs change. Since the nature of the library is changing, so are some of its more ancient premises. While quiet individual reading spaces are making way for more interactive areas of public gathering, the micro shelves allow for the creation of more secluded enclosures for those that require more intimate moments of listening, viewing, reading, etc. (Dijkstra. R, 2010)

## 7.0 Project Proposal

The thesis project proposal aims at addressing the issues outlined in this paper through the design of a new public library building in Toronto. The building would be sited at the current location of the Toronto Public Library's Sanderson branch at 707 Dundas Street West.

The site is at the end of the East/West corridor on Dundas, which both the city and the community see as an area for future growth. The existing branch of the library serves a population of 46,500. It is a busy neighborhood branch ranking within the first quartile of neighborhood branches. There are a number of planned and proposed redevelopments in the community which will impact future growth. These include the redevelopment of Toronto District School Board lands, Toronto Community Housing Corporation's Alexandra Park revitalization and proposed condominium developments. Community discussions about the future of the area have garnered consistent support by both the public and the Toronto Public Library for ensuring that the library remains in its existing location. A need for providing increased programming and service opportunities for the diverse population in the community has also been highlighted. (Toronto Public Library, 2012)

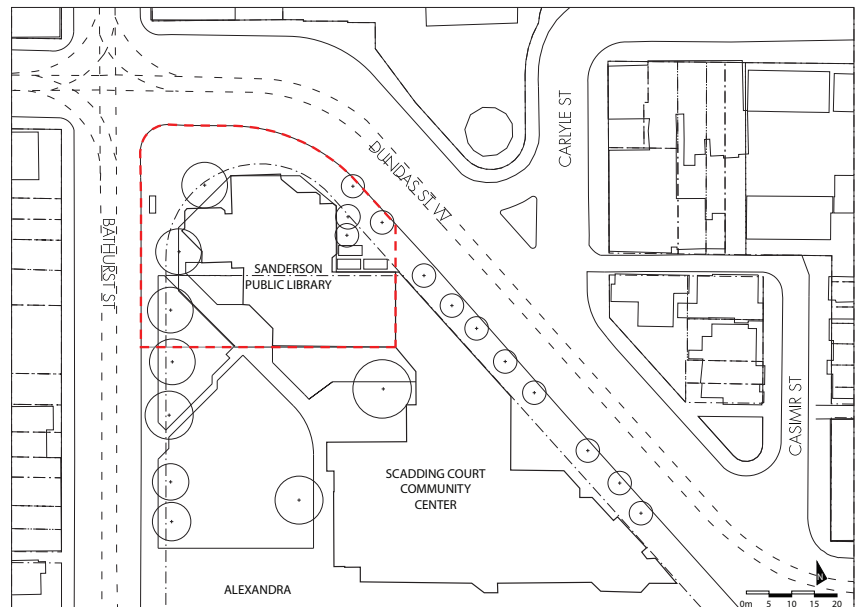


Fig 7.0-1 Site Plan

Based on the research conducted, the site was chosen due to three defining characteristics: physical location of the library, existing conditions of the library, and diversity of the community that the library serves.

## 7.1 Location

The physical location of the library presents various opportunities of interaction with the surrounding context. The library has a direct connection with the Scadding Court community center, a mini park connecting its main entrance to the community center's secondary entrance, as well as a children's playground. Immediately south of the site the community center's outdoor public rink, skate park, and pool are located. The outer surroundings consist of Alexandra Park to the south, Ryerson Community School to the west, Toronto Western Hospital to the north, and a mix of residential and commercial properties to the east of the site.



Fig 7.1-1 Areal View



## **7.2 Existing Conditions**

According to the Toronto Public Library branch statistics, the Sanderson branch ranks third in the number of visits, with 15% increase in visitors from 2011 to 2012, a large increase in information requests, as well as information users. (Toronto Public Library, 2012)

These numbers point to a positive rapport between the community and this branch. This is in part due to the branch's location amid a variety of other community hubs, various programs catered to a diverse community, as well as the children visiting from the adjacent school on a daily basis. The size of the existing library, however, is very limited. Upon multiple visits to the branch and discussions with the library manager, it became evident that there is a clear need of more space to provide the means and services the library's patrons require. The existing structure is one storey in height with a multipurpose room located in the basement. The main floor is comprised of: a small alcove for periodicals, book shelves for roughly one quarter of the floor plate, a small children's area, a multipurpose room, eight computer terminals, two very small quiet reading rooms, a circulation desk, staff offices, and book storage at the center of the room. Since all of these spaces are located in close proximity to one another frequent issues of noise arise when children going about their activities are present in the library.

## **7.3 Community Make Up**

The increase in visits to the branch (as pointed out in the previous section) is also reflected in the rising numbers of the Trinity-Spadina ward population where the library is located. As of the ward profile publication date, the total population of the ward has increased by 13% from 2006-2011. The area has a 35 year old median age, and the 25-44 demographic is considerably higher (by 20%) than the rest of the city. The majority of the population live in apartment buildings, with about half living in one to two person households. The cultural diversity of the area is also reflected in the languages spoken at home ranking from Portuguese, Cantonese, Not specified Chinese dialects, Mandarin, and Italian in descending order. (Toronto Ward Profiles, 2011)

The re-envisioning of the Sanderson branch will, therefore, need to be a multifaceted one in order to satisfy the needs of a predominantly computer savvy and culturally diverse population. The new library is then intended to act as a community node that needs to stay ahead of the curve of growth happening in its surrounding urban and social fabric. In order for this to happen the programmatic functions need to cater to the community needs, yet be flexible enough to accommodate the changing character of the library and its user's habits.

## 7.4 Design Elements

Resulting from the observations of the current social and urban state of the branch as well as an adaptation of the CABE report and analyses (CABE & RIBA 2004); eight design elements are highlighted that will be paramount in the development of the design:

### ***Establishing the proper character***

As mentioned in section 5.3, branch libraries in certain locations may present themselves to the public in particular ways and with specific programs. Each program element will need to reflect the priority services and character in that library for its particular set of users.

### ***The library as a second home***

The relationship between the role of the library and the home is changing. As more catalogues go online, they enable people to order, reserve or renew library materials, and even belong to electronic newsgroups for particular educational or cultural interest groups. This has led to a de-institutionalizing of the library, giving it the aura of a club or leisure centre. Through the design of interior spaces, layouts, and furnishings a more domestic, club-like sense of membership and belonging is created: a home from home.

### ***Time-tabling access and circulation***

Another important reflection about library design is flexibility. This revolves around the ability to be able to partition, or close some areas at different times to meet other needs, depending on the extracurricular services particular libraries may provide. Issues of time management and the provision of space and patterns of circulation need to be considered when designing to ensure both short and long-term library uses.

### ***The library as a public space and place***

Historically, library designs have highlighted their public nature through emphasized entrances, high ceilings, and with a marked relationship to the street level. Some libraries use steps, street furniture or gardens for people to sit, chat, or take a break from their activities inside; emphasizing the relationships between interior and exterior aspects of the public realm. While some of the more grand or monumental aspects of library design could be left behind, the emphasis on the civic qualities of library spaces and their relationship with the street level outside will remain a design priority.



### ***Finding a way through the labyrinth***

Through their nature, libraries are loaded with signs and references to arcane classification systems, often confusing and alienating to unfamiliar and casual visitors. The clarity of patterns of circulation, of architectural and spatial legibility, and of coherent and aesthetic signage is paramount. This allows new visitors and existing patrons to better understand and appreciate what is being offered very quickly.

### ***Designing in (and out) of technology***

Library services and facilities will need to incorporate information and communication technologies and online services. All electronic equipment has specific design and implementation requirements: be it power sources, network connections, lighting, security, etc. The design also needs to take care of matters of monitoring and surveillance for appropriate individual and group use.

### ***Handling conflicting needs and interests***

Due to the wide range of demographics using libraries, conflicts of expectations and use can occur. Children's areas can be noisy with various activities, and need to be designed to have a minimal effect on other users, as well as being spatially separate enough from a security standpoint. Teens may want to gather in groups and talk as they read or interact with one another. The ancient golden rules of silence are no longer applicable to many new library uses and users. Another example is the allocation of a library cafe where issues of noise levels may arise. Due to libraries' public nature and variety of applications, handling potential conflicts of use is an issue that through attentive design can be minimized if not resolved entirely.

### ***Family-friendly design***

Among the more frequent user groups of libraries are parents with young children and the elderly. The library is still a socially inclusive institution, and it needs to reflect this in barrier free and family friendly design. Encouraging longer periods of stay for people and use of all available facilities requires adequate provisions of amenities as well as a sense of security. The future library is as much a learning center, homework club, and leisure venue as much as it is a place for borrowing and returning books.

### 7.5 Future Guidelines

While many of the preceding design elements can also be found in existing libraries today, to incorporate them as a whole, a new set of schemes need to be developed in order to distinguish from the traditional to the future design guidelines of library design, the latter of which this thesis aims to achieve:

Traditional	> Future
Physical	> Digital + Physical
Static	> Dynamic
Fixed	> Flexible
One to many	> Many to many
Separated Tech.	> Integrated Tech.
Consumer	> Consumer + Producer
Standardization	> Customisation

(Dijkstra. R, 2010)

### 7.6 Preliminary Program

In addition to supplementing the needs of the existing branch, a mapping exercise was undertaken (Fig 7.6-1) to inform the creation of the library's program through the observation of the surrounding urban context's features and various social layers. This resulted in different community hubs scattered in proximity to the library site. The library can establish connections with these hubs where necessary by providing auxiliary programs to better serve the neighbourhood. While these programs can be flexible in magnitude and scope, they are intended to give the library agency as a place where people can not only be consumers but also producers of information.

The generated program list (Fig 7.6-2) is a combination of the observations presented before aiming to cater to all of the needs and requirements current and future library visitors may have. The design will adopt organisational tools made possible by the aforementioned technologies to amalgamate books and digital media in order to enhance the experience for users as they interact with the information and services of the library.



<b>Multipurpose Spaces (200 sq.m)</b>	<b>Private Rooms (200 sq.m)</b>
Activate	Quiet
Eat	Group Study
Discussion	Meeting
Play	Reading
Debate	
Dance	
<b>Children (300 sq.m)</b>	<b>Exhibition Space (200 sq.m)</b>
Reading	Arts
Play	Culture
Learn	Showcase
Hangout	Interact
<b>Creative Spaces (80 sq.m)</b>	<b>Staff Offices (130 sq.m)</b>
Computer Lab	Discuss
Self Print	Plan
Publish	Organize
<b>Cafe (140 sq.m)</b>	<b>Storage (150 sq.m)</b>
Relax	Materials
Socialize	Media
Talk	Books
<b>Tech Spaces (120 sq.m)</b>	<b>Reading Spaces (400 sq.m)</b>
Learn	Open
Discuss	Private
Computers	Spread Out
Lifeskills	Customizable
<b>Outdoor Space (250 sq.m)</b>	<b>Auditorium (172 sq.m)</b>
Sun	Lecture
Read	Event
Meet	Action
Connect	Discuss
	Watch
	Information

Fig 7.6-2 Preliminary Program List

## 7.7 Graphic Program

In order for the design to reflect the multiplicity and flexibility afforded by digital means, a two-part exercise was undertaken to look at and compare the various program elements. This was also done to achieve a better understanding of the complex nature and relationships these program elements have. The first exercise, while basic, was to verbalize the activities that may occur in each programmed space and provide a graphic representation of them. Below are a few examples:



Open

Reading Spaces (400 sq.m)



Spread Out



Customizable



Private



Fig 7.7-1 Reading Space Samples Collage



Learn



Play/Learn/Learn & Play



Play/Learn/Read/Hangout

Children (300 sq.m)

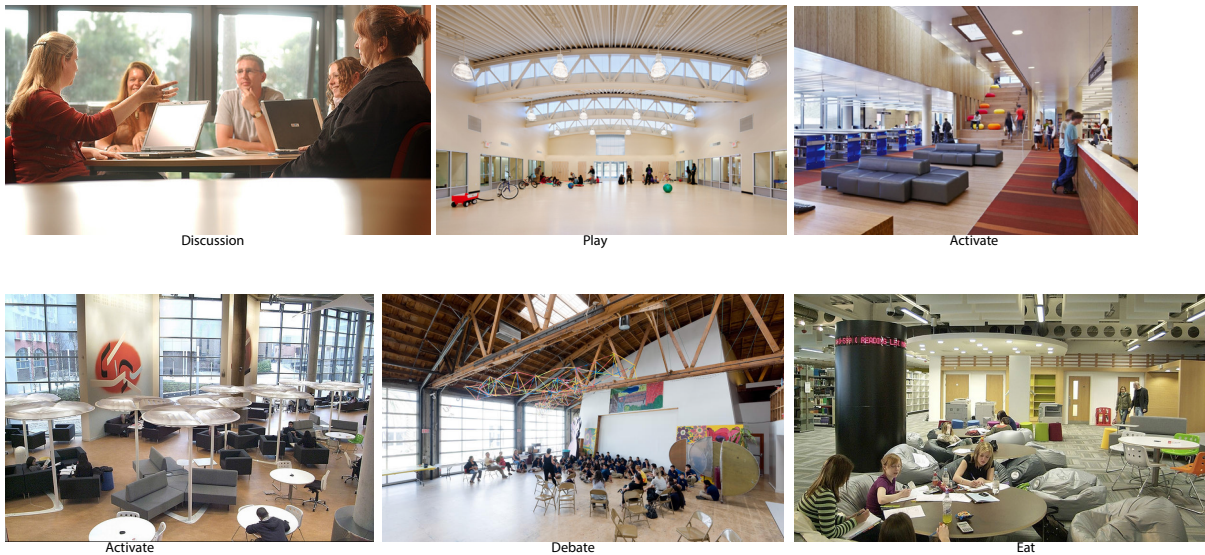


Reading

Hangout

Fig 7.7-2 Children's Space Samples Collage





Multipurpose Spaces (200 sq.m)

Fig 7.7-3 Multipurpose Space Samples Collage

## 7.8 Programming Sheets

The second part of the programming exercise involved defining the technical and spatial characteristics of the spaces housing the specific program elements. In this case, a detailed list of requirements was used as a common denominator for all the elements to better gauge their role in the overall design. In addition, any particular details pertaining to given spaces would prove useful in optimizing their placement in relation to one another. Each part of the program is defined through six categories: Spatial Relationships, Activity Type, Spatial Components, Environmental Characteristics, Safety, Acoustics, and Lighting. Figure 7.8-1 illustrates an example of the programmatic characteristics of the reading spaces.

READING SPACES	
Purpose	To provide space(s) for patrons of all ages to read the materials offered by the library to varying degrees of privacy/quiet.
<b>Spatial Relationships</b>	
General	Space should be centrally located to easily connect with other programmatic elements. This is where most of the physical library materials will be located.
Specific	Reading spaces for kids and adults should be spatially/acoustically separate. Main reading space to be semi-private and have dedicated "quiet" reading spaces/rooms.
Activity Description	Patrons can read and lounge in this space. They are to "mingle" with the micro shelves and interact with them through their reorganization or just search for their desired book and retreat to a seating area.
<b>Activity Type/ Spatial Components</b>	
Wi-Fi/Ethernet Access:	Wi-Fi
Acoustic Level (S,M,L):	M
Connection to C.C	No
Furniture (Fixed/Flexible):	Flexible
Patron Traffic (S,M,L):	M
Flexible Partitions:	Yes
Dedicated Washrooms:	Yes
Communal Table(s):	Yes
Study Furniture:	Yes
Privacy Level (Pr,O,SP):	Open, Semi Private
Special Furnishings:	Microshelves
Expansible Space(s)	Yes
Multipurpose Space	No
<b>Users</b>	
Patrons:	Adults and Teens
Dedicated Staff:	2-3
Average Hours per Week Usage:	60/62
<b>Environmental Characteristics</b>	
Ceiling Height Requirements	High Ceilings
Circulation	Located adjacent to main circulation "spine" of building. Close proximity to library's main entrance. Direct access to elevator/stairs to communicate with second floor/mezzanine.
Materials/Surfaces: Large, Small, Soft	Materials minimizing glare. Large glazing to allow for day lighting and better reading conditions.
<b>Safety:</b>	
Alarms Required	No

Fig 7.8-1 Programming Sheet for Reading Spaces





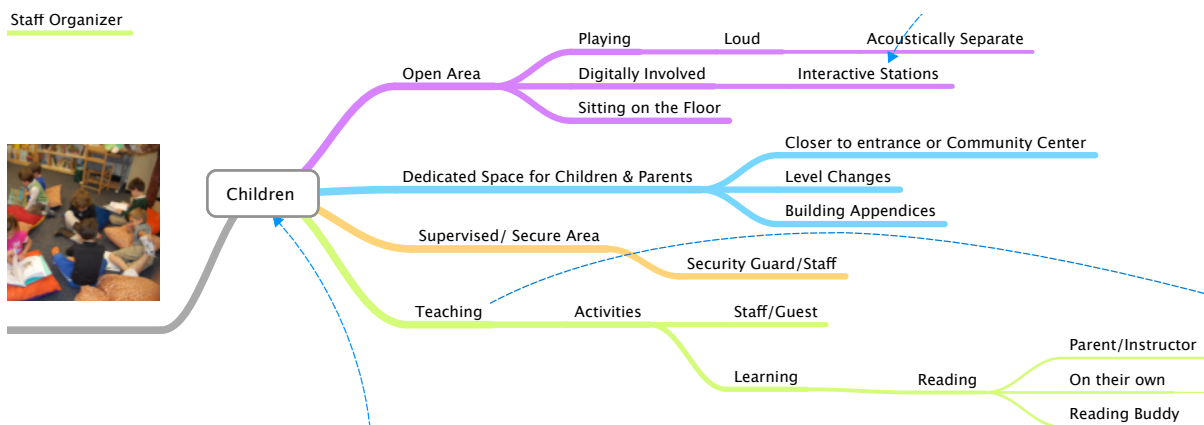


Fig 7.8-3 Detail of Program Elements Mapping

## 7.9 Library Users

While the demographic profile of the community around the Sanderson branch in section 7.3 gave a general idea of who the principal users of the library might be, it lacks in the same kind of specificity which raised the concerns and ideas that generated the program. Once the program was developed, the issue then began to revolve around the people that are currently frequenting the library. In order to achieve this, an informal observation of the individuals that visited the library was undertaken over a period of a week (Fig 7.9-1). Although the sampling period was not lengthy enough to warrant it as a legitimate survey, this method provided sufficient insight into the numbers of patrons and their demographic age group's visiting patterns. Each pixel represents roughly ten people present at any given moment.

Due to the proximity of the school, children were almost always present in large quantities during lunch time and after-school hours. The library seems to work as a protected environment for them to either gather with their friends after school or wait to be picked up by their parents. The same went for teens as well, the only difference being they seemed more independent and stayed in larger numbers until closing hours, usually gravitating towards the computer terminals and multipurpose space first. For the most part, computer usage was dedicated mostly towards gaming, social media, and entertainment for both children and teens. Adults (this category also includes seniors) visited the library at a consistent rate with an equal distribution into the print, digital, and work areas. As previously mentioned, due to the limitations of the library's size, this ratio could also be attributed to patrons having to use the only available unoccupied areas when they visit.

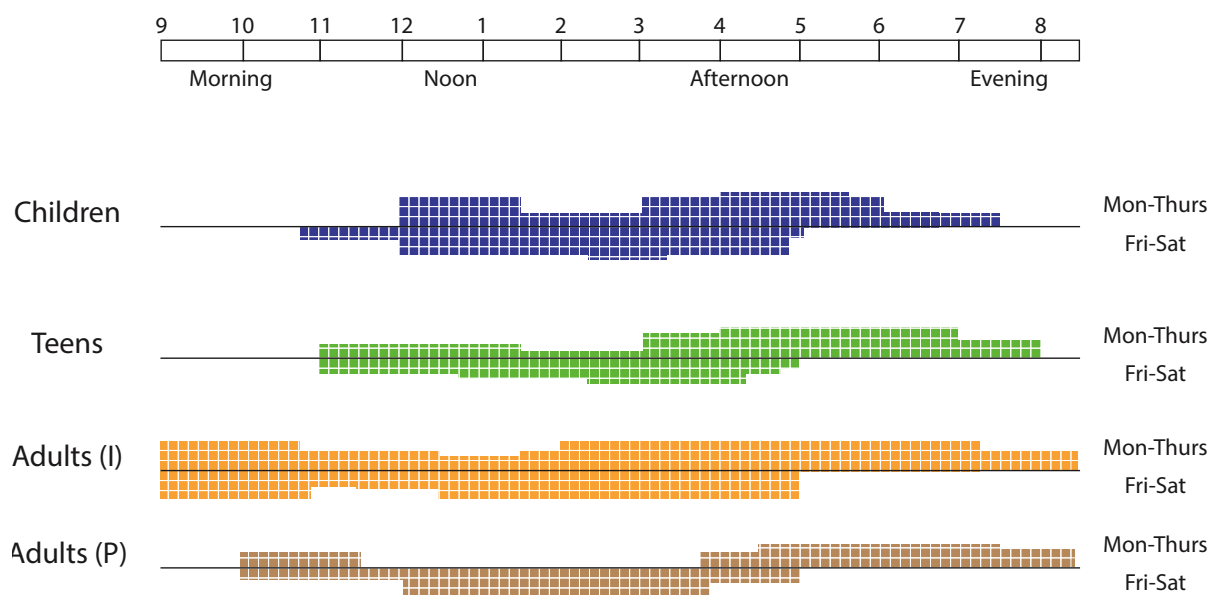


Fig 7.9-1 Demographic Profile of the Sanderson Branch Patrons

Last and perhaps the most interesting group of people observed visiting the library were parents with children. They also used various amenities in the library. However, they did so in two ways depending on the age of their children. Those with younger kids tended to read or do activities together with them often interacting with other parents and children present there. Those with older children (preteens) often let them explore the spaces and materials on their own, and kept an eye on them from time to time, as they used a computer station or read a book on their own. Aside from its regular services, in this case the library also plays the role of an ad-hoc learning playground providing an education destination for parents accompanying children.

The next step was to quantify the total number of visitors for the overseen period in order to determine the ratio of demographics visiting the library. This was then coupled with the program elements to see which user group benefitted most and which space they would most likely gravitate towards. The size and quantity of age groups linked to each element determined that space's program hierarchy. The density and frequency of use was then translated into a rearrangement of spaces that would profit from proximity to one another. This also allowed for the creation of spatial coefficients to more accurately estimate the blocking and spatial proportions of the floor plans (Fig 7.9-4). The blocking of the program also allowed for determining which areas would have flexible or rigid boundaries. In this case, the flexible spaces enable the library to have a gradient of functions going beyond their predetermined use should the future needs of the library change.

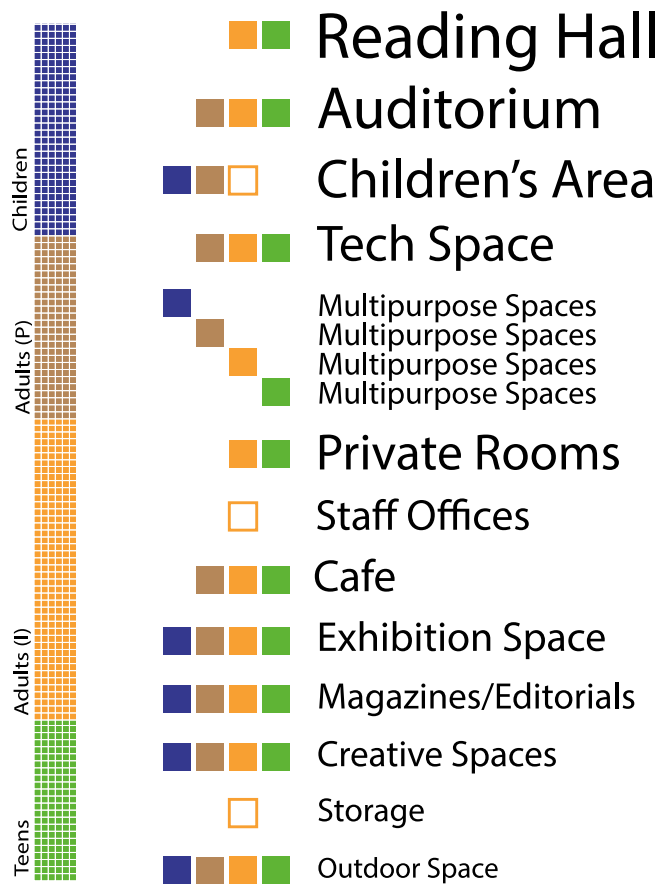


Fig 7.9-2 Summary of Demographic Analysis Generating Program Hierarchy



Fig 7.9-3 Spatial Proximities Generating Spatial Coefficients

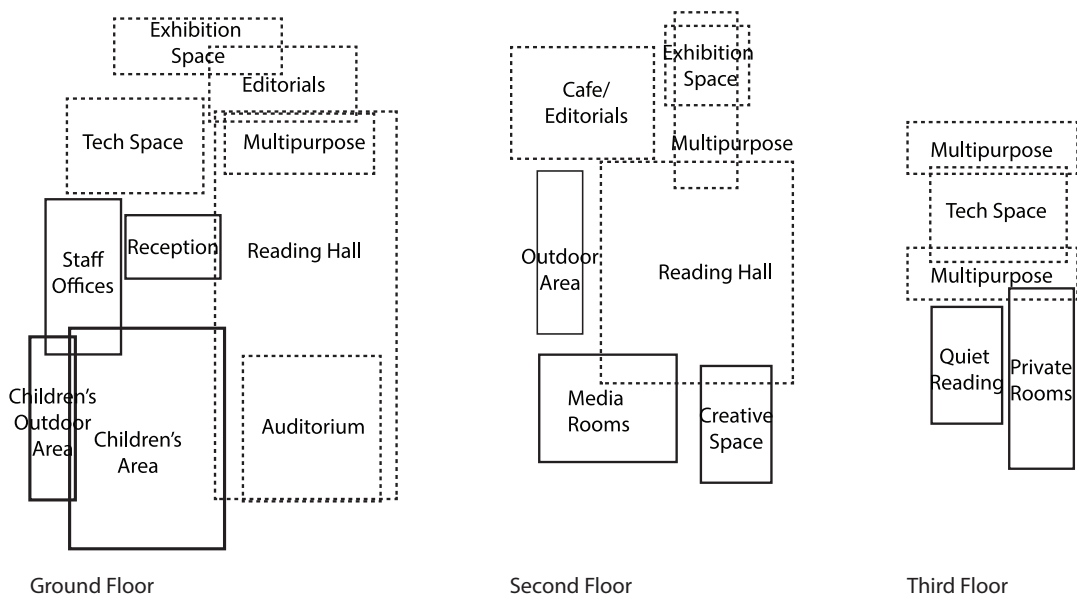


Fig 7.9-4 Blocking Diagram Illustrating Spatial Proportions and Flexible Spaces

7.10 Massing Principles

7.10.1 Sight

The site’s peninsula like shape gives it multiple line of sight vantage points both from within the site and the surrounding areas (Fig 7.10-1). This is relevant for not only the library to have a visual connection to its immediate urban context but also to display the various activities and programs happening within. Even for those casually passing by, the library should have enough of a presence to be read clearly.

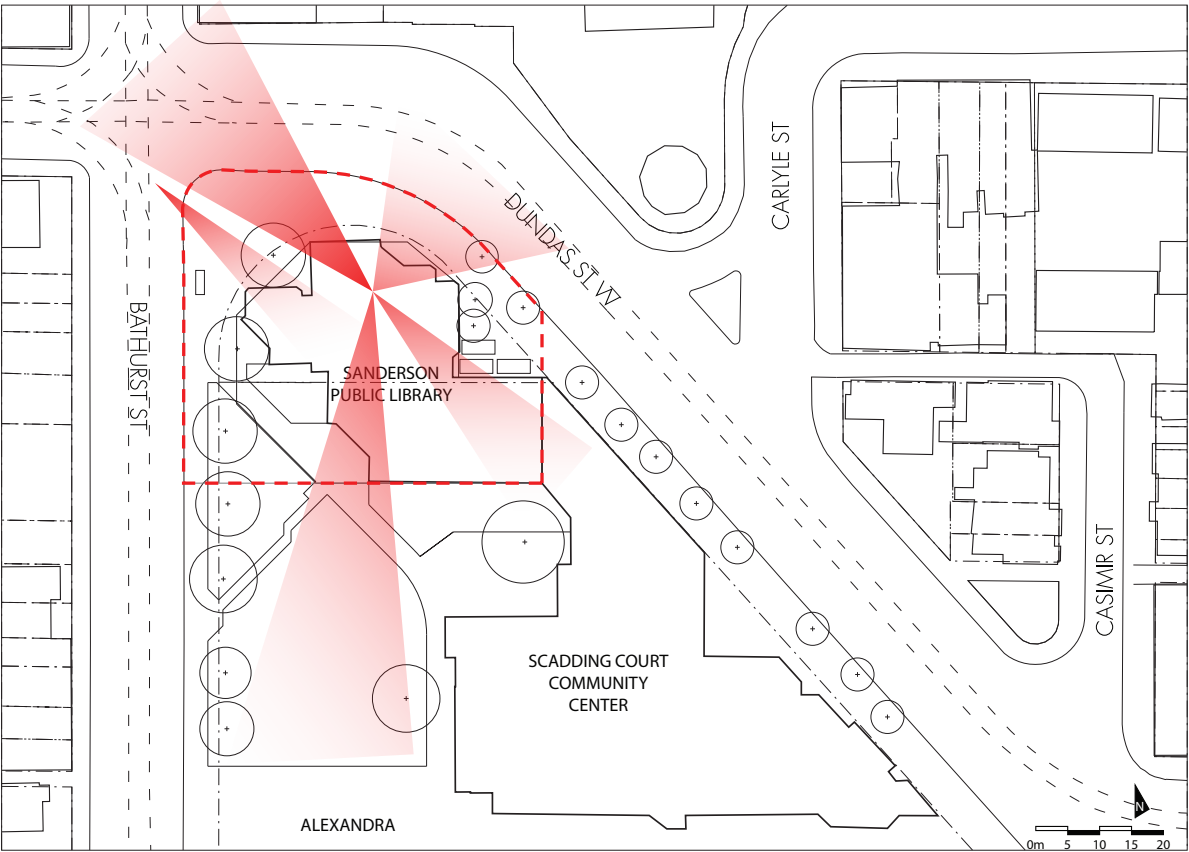


Fig 7.10-1 Views In and Out of the Site

Beginning with an extrusion of the available building footprint, a series of cuts are made to the three storey shape. First off, the facades, and therefore views, are now oriented towards Dundas street, the main intersection, the view across the park to the children's play area, and the secondary entrance to the community center. An indentation demarcates the new entrance, looking and interacting directly with the bustling intersection. A terracing of exterior spaces then points the viewer's attention down to the ground floor again, while simultaneously opening up the view to the community center entrance. The terraces also direct the attention of those inside towards the children's play area, should the need arise for parents to be inside the library while their children play outside. The indentation on the south side now also allows for the left over space to be turned into a proper parking space for the staff, and perhaps even for a pick-up and drop-off point for parents (Fig 7.10-2).

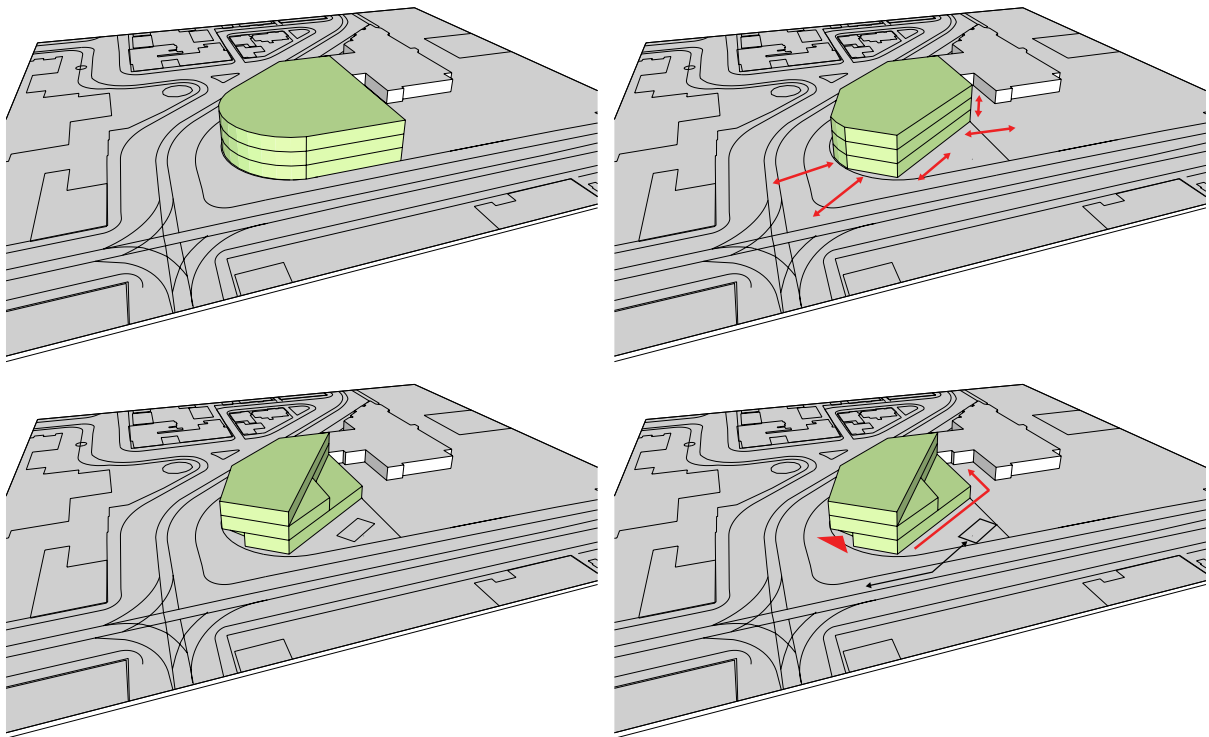


Fig 7.10-2 Massing

7.10.2 Sound

Instead of reverting to the old rules of silent reading the library must accommodate all types of new and louder uses. In order to accommodate this and to avoid removing flexibility by putting up partitions and solid walls, the design will employ a method of compartmentalizing sound between spaces.



Fig 7.10-3 Sound Compartment Diagram

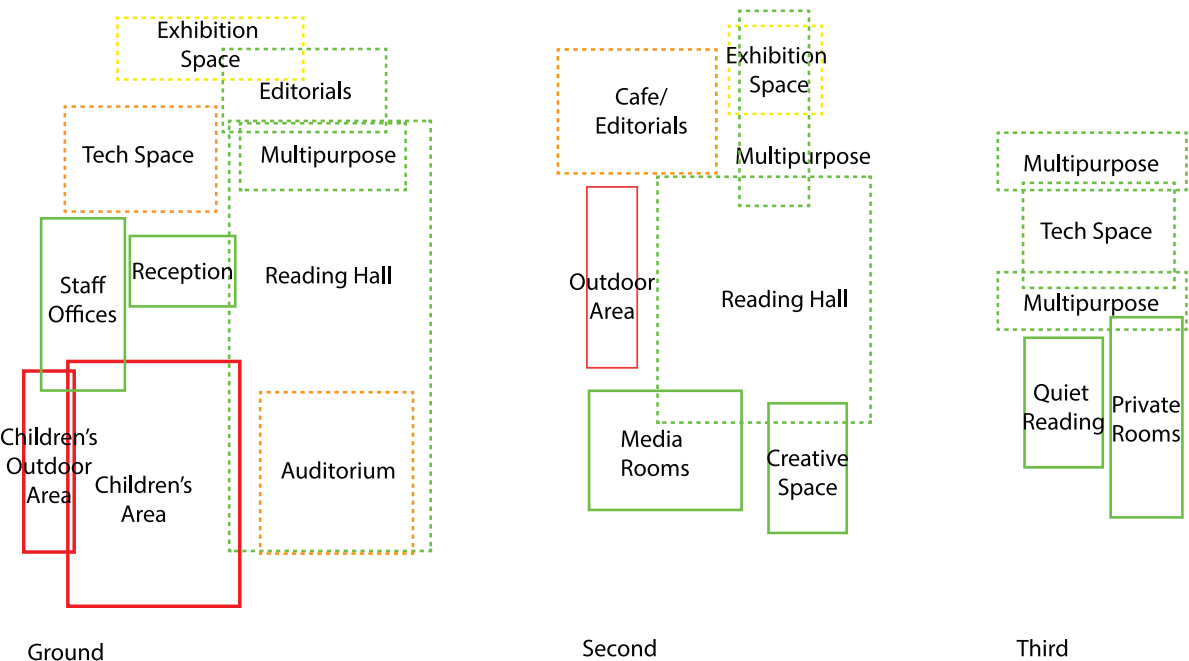


Fig 7.10-4 Sound Levels in Program Elements

Firstly, the louder spaces will be located towards the entrance and outer perimeter of the building. Secondly, by creating a landscape of sloped ceilings spaces and drops in floor elevations, noise can emanate away from quieter low-activity spaces (Fig 7.10-3). Material and surface finishes will also play an important role in turning the acoustics of spaces into contained pockets of sound. As shown in Fig 7.10-4, the arrangement of the spaces translates into a vertical noise gradient where the noise levels experienced will be in direct correlation to the engagement the user has with the building services. The deeper one goes and experiences the library, the more opportunities they will have to find the appropriate noise levels for the task they need to perform.

## 7.11 Interactive Spaces

Taking a few cues from the Seattle Public Library, computers can now transcend their physical boundaries and interact with dynamic proximity platforms such as RFID tags. These tags enable a signal transfer between a computer and an object, thus enabling new forms of micro-locating within an intelligent space (Fig 7.10-5). Dijkstra and Higelfort argue to the possibility for everything (in the library) to be tagged, and thus integrated, along with the information that makes those things useful. The ubiquity of tagged objects as part of geolocate technologies will also bring about new opportunities for design and new opportunities for librarians as knowledge managers. (Dijkstra, R, 2010)

Niegard also highlights the advantages such technologies can have through new ways of surveying user's behaviours. She highlights digital precedents where spaces and technology are melding together, mediating new ways of user-material interaction (be it digital or material). Through pervasive computing, library spaces can become more interactive, and information can be accessed directly by patrons through their own mobile devices. (Niegard, 2011)

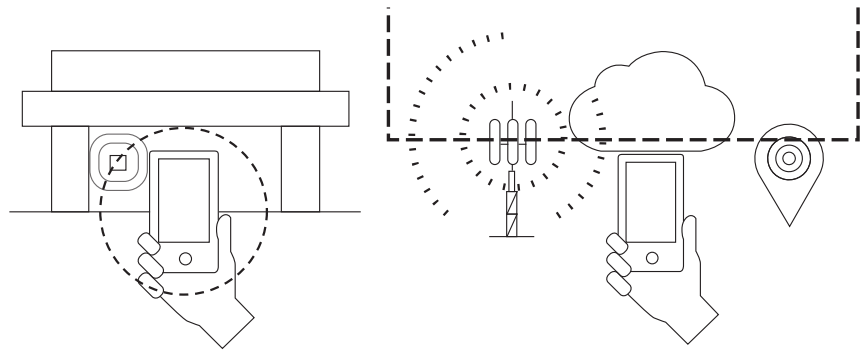


Fig 7.11-1 Micro-Locating and Geolocate Technologies

Since knowledge is not relegated to monolithic shelving units but dispersed throughout the library, this becomes a self-organizing system that responds to information dynamics and trends. This organizational strategy also adds an interactive social layer where like minded users with similar interests can gravitate to similar areas of the library. The concept of the future library as reiterated in this thesis is not about books but people. The amenities provided will go beyond those of rudimentary computer stations with internet access. The intent is to give community members the tools and possibilities to engage with technology at a deeper, more personalized level while also providing a mix of multipurpose spaces for collaboration, learning, meeting, reading, and relaxation.

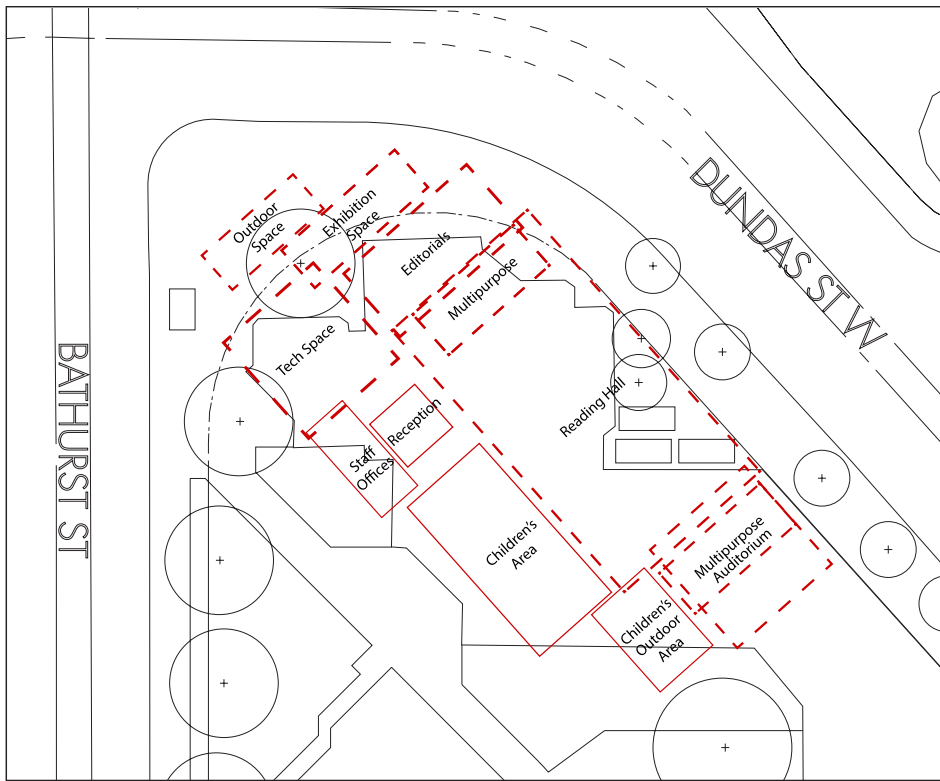


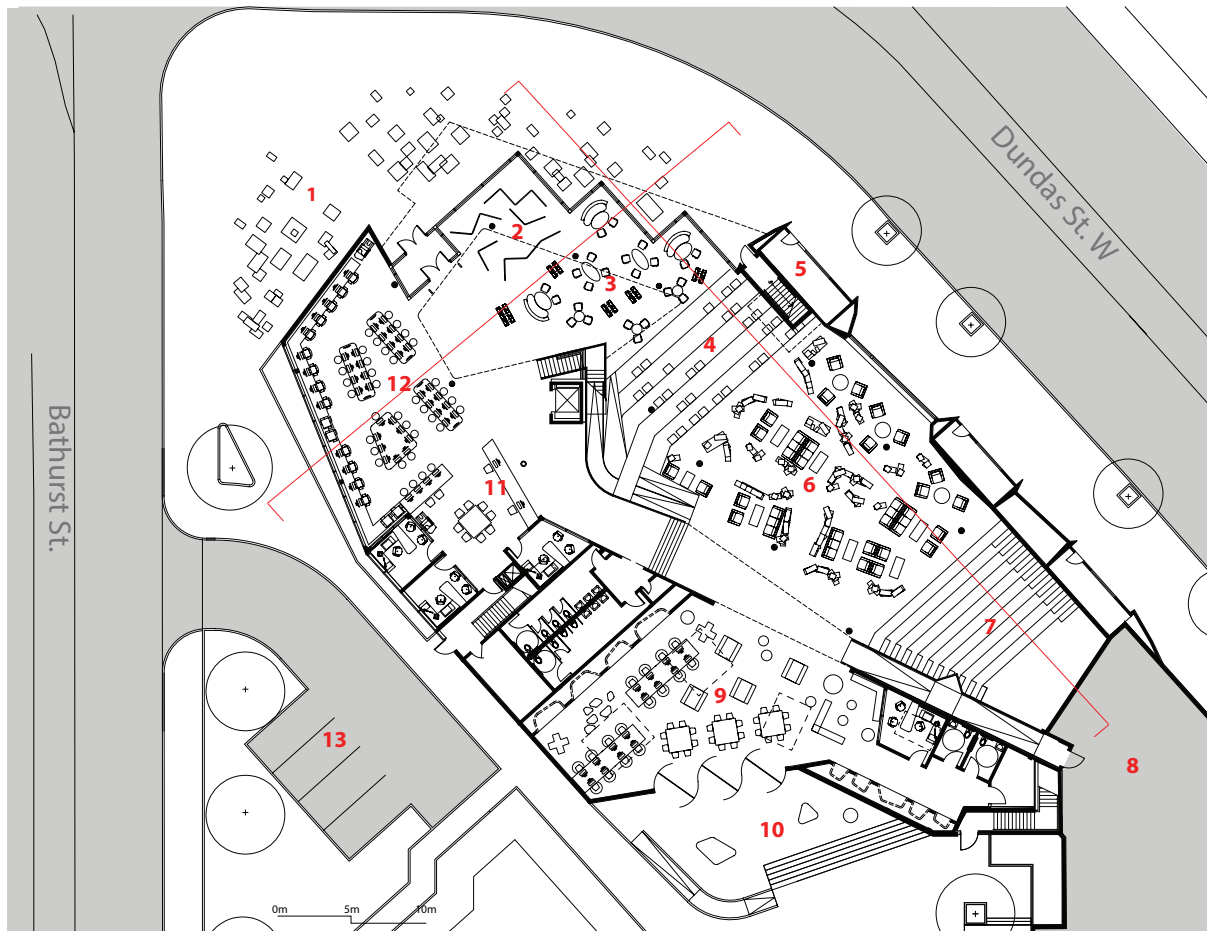
Fig 7.12-1 Blocking Adjusted According to Site and Design Principles

## 7.12 Ground Floor

Before the plans could be finalized, the previously described blocking diagram was laid over the site and adjusted in accordance with the outlined design principles (Fig 7.12-1). On the ground floor, due to the orientation of the building, a main axial ribbon of circulation cuts across all three levels of the building feeding the adjacent spaces and providing an intuitive way of navigating about the library space. In order to make way finding easier, all the seating is color coded so that all tech spaces have green seating, seats for reading are red, and children's furnishings are blue. The program is arranged in such a way where the more flexible spaces are located on the north side of the aforementioned axis and the more rigid, enclosed portions to the south of it. Right next to the entrance, an exhibition space is allocated to showcase art and installations from students and local artists alike (depending on the programs the library is running).

This portion of the floor is glazed so that a gradient can be created between interior and exterior spaces. This gives tourists and nonmembers of the community an opportunity to catch an enticing glimpse of the various activities happening within the building.





- |                     |                              |                      |
|---------------------|------------------------------|----------------------|
| 1. Outdoor Seating  | 6. Reading Hall              | 11. Circulation Desk |
| 2. Exhibition Space | 7. Auditorium                | 12. Tech Space       |
| 3. Editorials       | 8. Existing Community Center | 13. Staff Parking    |
| 4. Informal Seating | 9. Children's Area           |                      |
| 5. Food Kiosks      | 10. Children's Outdoor Area  |                      |

Fig 7.12-2 Ground Floor Plan

The exhibition space then morphs into the editorials section where magazines and periodicals are available. This space is intended for those not interested in spending too much time in the library, using it as a quick pit stop to catch up on the daily news. What follows is a set of shallow stairs where casual users can hang out in small groups without the need for a quiet space. The floor level change is complemented by a twin set of ramps. One is for barrier free access while the other is more of a place for kids and teens to bypass the stairs quickly should they be occupied by people seating on them. On the lower level, and taking advantage of the now higher ceiling is the main reading hall (Fig 7.12-3). This space is loaded with lounge furniture aimed at longer periods of stay for those who want to read through a book or chat with others.



Fig 7.12-3 Reading Hall

Microshelves are dispersed in between for easy access to materials and the optional rearrangements of their spaces. The floor then steps down again taking a cue from the shallow steps, only this time it's a steeper drop that turns into a multipurpose auditorium space for instruction, lectures, and special activities (Fig 7.12-4). A series of dropped ceiling panels ensure that noise levels are contained. The ramp that connects the end of the ribbon to the community center also has a dual purpose in that it acts as an observation pod when events are taking place.



Fig 7.12-4 Longitudinal Section

South of the circulation ribbon is the first tech space (Fig 7.12-5). Made up of cataloguing and internet access terminals, its proximity to the entrance makes it an express space, with similar short term use as the periodicals section across from it. The tech space also shares a communication desk with the main circulation desk for those needing help navigating catalogues or accessing web-based information. The staff operated area is centrally located, opposite the elevator and central staircase foyer in order to point visitors easily to the right spaces. A secondary entrance is dedicated to the staff offices behind the circulation area, situated so they can have private access and also for any deliveries of materials.



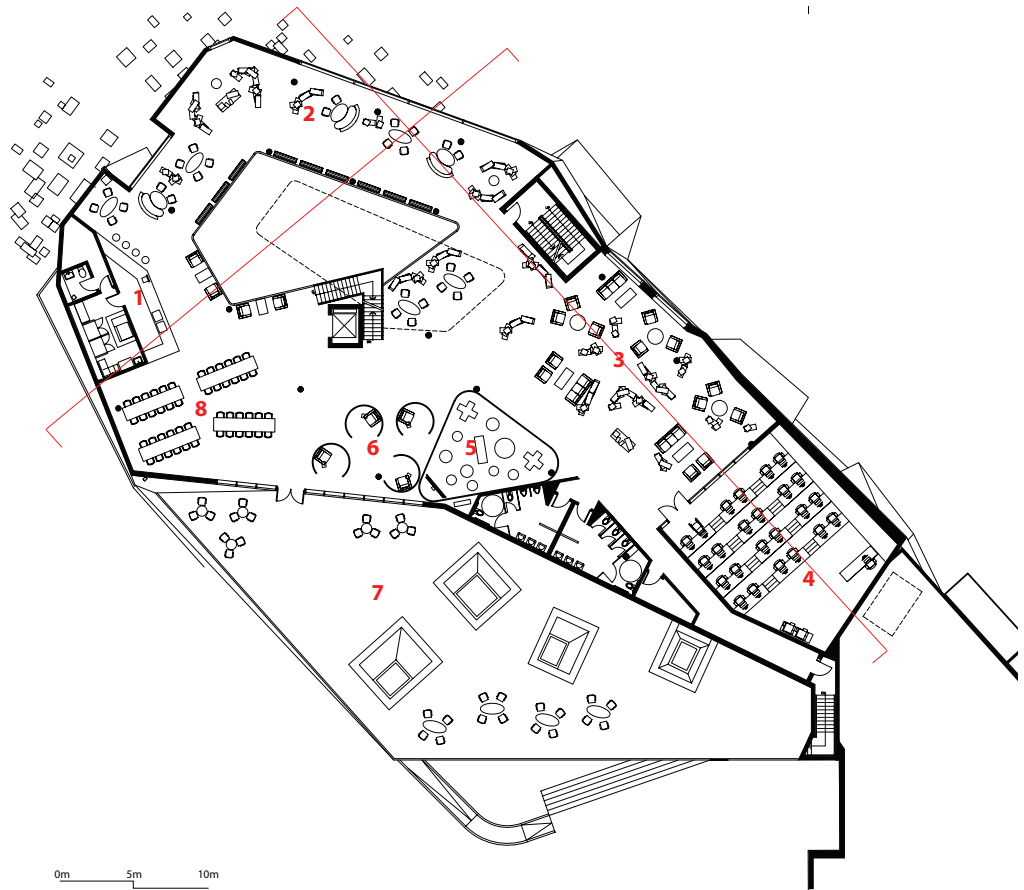
Fig 7.12-5 Tech Space

The southeast end of the ground floor is dedicated to the children's area (Fig 7.12-6). Physically this area is separate from a security standpoint but also in view of the reading hall for parental observation. Taking advantage of the lower floor level a deeply sloped ceiling provides the required acoustic controls while a series of light wells provide additional diffused light for reading and activities. The space looks into a sunk outdoor play area that also serves as a direct connection (both visual and circulatory) to the adjacent playground as well as community center entrance.



Fig 7.12-6 Children's Area





- |                  |                         |
|------------------|-------------------------|
| 1. Cafe Bar      | 5. Media Room           |
| 2. Editorials    | 6. Quiet Reading Booths |
| 3. Reading Space | 7. Terrace              |
| 4. Computer Lab  | 8. Study Space          |

Fig 7.13-1 Second Floor Plan

### 7.13 Second Floor

The second floor spatial layout is a further elaboration on the layout of the ground floor. This floor caters to users who visit the library for extended periods of time, giving freedom of choice between regular reading spaces or more quiet working environments. The provision of a café bar further highlights the aspects of social interaction, as well as providing an additional focal point in the program for users, new and old, to gravitate to. Periodicals now occupy a smaller footprint giving way to a mix of couches and microshelves. On the south-east end of the building, using the slope of the auditorium ceiling below, a secondary computer lab acts as a multipurpose tech space for digital seminars, tech lectures, or more dedicated computing power going beyond the express

access of the tech spaces a floor below. This level also introduces quiet reading spaces as well as a multimedia room for children and teens to watch videos, listen to music, or play video games (Fig 7.13-2). In addition, the second floor is opened up to a large terrace overlooking the park to the south as well as within acoustic and visual range to the outdoor children's area below. The sloping light wells for the children's area below also serve as outdoor seating, highlighting the flexibility of the space for special events or extensions of indoor activities.



Fig 7.13-2 Cross Section

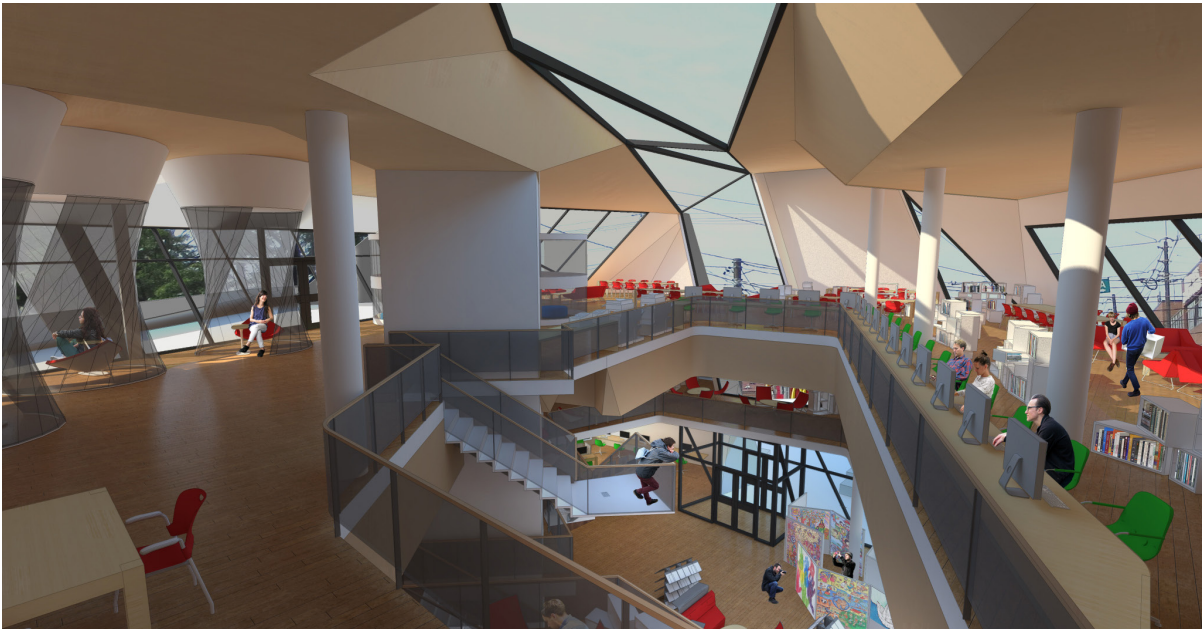


Fig 7.14-1 Foyer Looking Down



- |                  |                           |                         |
|------------------|---------------------------|-------------------------|
| 1. Study Space   | 5. IT Room                | 9. Quiet Reading Booths |
| 2. Tech Space    | 6. Multipurpose Rooms     | 10. Media room          |
| 3. Reading Space | 7. Community Meeting Room | 11. Viewing Terrace     |
| 4. Study Rooms   | 8. Staff Offices          |                         |

Fig 7.14-2 Third Floor Plan

### 7.14 Third Floor

The third floor amenities are dedicated to quieter functions of study areas. The diagonal ribbon still governs the circulation despite this floor having the more enclosed spaces (Fig 7.14-2). To keep constant with the permeability of the previous spaces, a large skylight brings light into the foyer as well the rest of the floor (Fig 7.14-1). Adding to the sense of openness is an additional balcony that forms a terrace of visual interaction between the interior and exterior similar to the level below. A tertiary set of computer terminals completes the last of the tech spaces. These are complemented by communal study tables and a combination of private and public reading and lounging spaces. As per the floors below, microshelves can also be used as spatial dividers between

the computer stations and study desks or vice versa. The end of the space is composed of the more inclusive elements such as private reading rooms, offices for staff expansion, as well as community meeting rooms for various multipurpose events.

### 7.15 Building Exterior

The skin of the building is expressed as a metaphor of the agency of the book in the future. Drawing inspiration from unfolding book spines, it is more of a reflection on the changing reality of the library than a literal representation. The design can be interpreted as being 'an open book' in its aim towards inclusivity and providing learning from a variety of intelligent sources. It is purposeful in its aim to act as a landmark, as a multifaceted gem, where



Fig 7.15-1 Exterior Southwest View

each of the facets give differing opinions and thoughts on what the library is and what it should be. To apply this idea, the skin will use light grey aluminium cladding where each panel, due to the multi- angular layout of the skin, will be hit by sunlight in a different way and thus produce a different type of reflection (Fig 7.15-1).





Fig 7.15-2 Exterior Northeast View

In order to have a concrete connection with its immediate context each facade of the library interacts with its surrounding in a specific way. On Dundas, the shipping containers that serve as fast food shacks have been pulled up to the library and enveloped by the skin to create canopies and moments for people to pause and view the connection and bridging of landscapes from street level to building face (Fig 7.15-2).



Fig 7.15-3 Exterior West View



Fig 7.15-4 Foyer Looking Up

Proceeding from Dundas a strip of glazed frontage wraps around the front of the building then shoots up culminating into the skylight of the library's foyer. The change in direction of this glazed strip highlights and accentuates the main entrance, and in order to see if and where the strip becomes the skylight one must enter the library to find out (Fig7.15-3).

Addressing the main intersection, a pixelation of stacked and scattered cubes serve as an informal outdoor seating area that highlights the main entrance and provides moments of pause for passersby to observe the activities happening inside. They also create a connection with the interior as they are reminiscent of the stacked microshelves prevalent on all three floors (Fig7.15-3).

As one enters the library their eye is directly lifted upward through the foyer to the skylight. The openings in the floors give visitors a sample preview of the variety of activities going on in the library. The spaces behind the staircase and elevator are purposely hidden by the dropped ceilings. It is only once a visitor goes deeper into the library, that spaces such as the main reading hall start to reveal themselves. This duality is purposeful in execution as the library reveals itself differently to users, depending on their engagement with the program. This entices casual users and visitors to want to come back to the library and experience it in a new way.

## 8.0 Conclusion

Will the library play a role or have a place in people's lives in the future? From the literature, concepts, precedents, and design outcomes of this thesis my answer is "yes." The view that libraries and their books will die and give place exclusively to web based interactions of downloading content is a misguided one. Many of the key phrases, and the context they are used, in the discussion of libraries and information technologies have clouded perceptions that their relationship is doomed to be a parasitic instead of a truly symbiotic one. While the services that libraries may provide can be independently found in a myriad of other environments, the crux of the argument lies in the opposite not being true, in that libraries will continue to be collective, broad, and unique places dedicated to the dissemination of knowledge and culture.

In premodern times, only the privileged and well off individuals had access to the library. The 19<sup>th</sup> century renewal turned the library into a place for the masses, a communal environment for access to knowledge and culture. Regardless of that knowledge being physical or digital in the 21<sup>st</sup> century, the principles of the library remain unchanged. What does need to change is the outlook and attitudes towards the continued evolution of formats, sources of information media, capabilities, services, and physical representations. If this mentality can afford to not remain stagnant for any period, and move in sync with the Digital Age, then the library will endure as a nucleus of knowledge and significant place for gaining new intellectual and socio-cultural experiences.

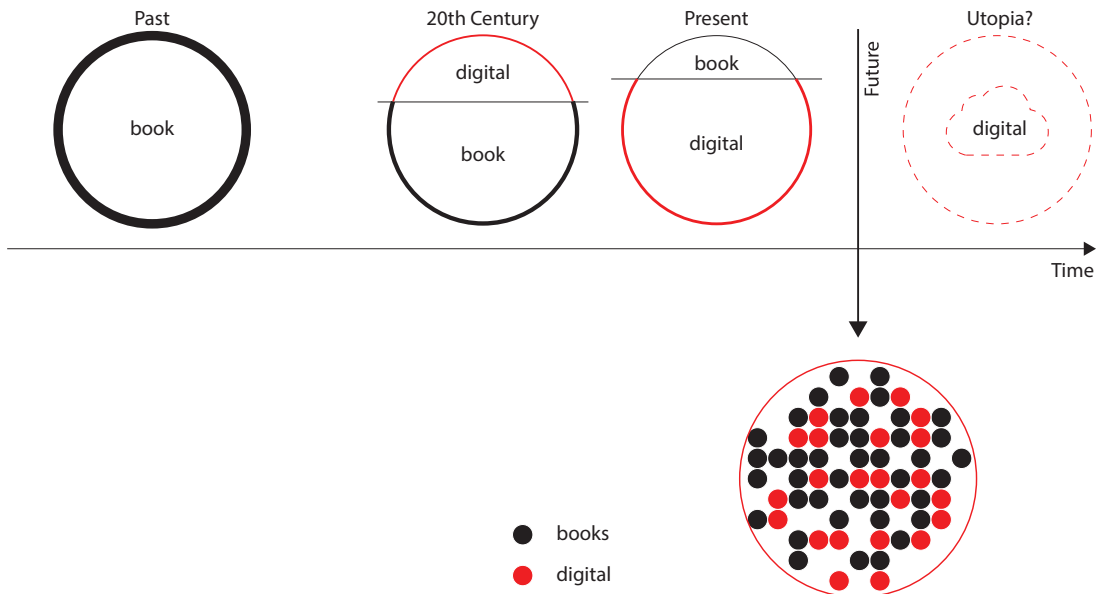


Fig 8.0-1 Library Trends Over History

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