DLC: AN INTERACTIVE MUSEUM OF TECHNOLOGY AND DIGITAL LEARNING CENTRE FOR WINNIPEG’S EXCHANGE DISTRICT

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A Practicum submitted to the Faculty of Graduate Studies of
The University of Manitoba
in partial fulfillment of the requirements of the degree of

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## TERM GLOSSARY:

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<th>DESCRIPTION:</th>
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<td>1</td>
<td>ACTIVE LEARNING</td>
<td>Active Learning is a form of learning in which teaching strives to involve the individual in the learning process more directly than in other methods.</td>
</tr>
<tr>
<td>2</td>
<td>HUMAN-COMPUTER INTERACTION (HCI)</td>
<td>Human-Computer Interaction is a field of study focusing on the design of computer technologies and how they affect and create an interactive dialogue between the users.</td>
</tr>
<tr>
<td>3</td>
<td>VIRTUAL REALITY (VR)</td>
<td>Virtual reality is a simulated experience that can be like or completely different from the real world. Virtual reality is created and requires specialized software to be experienced.</td>
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<td>4</td>
<td>ARTIFICIAL REALITY (AR)</td>
<td>Across multiple sensory modalities, including visual, auditory, haptic, somatosensory, and olfactory - Artificial Reality is an interactive experience of a real-world environment where the objects that reside in the real world are enhanced by computer-generated perceptual information.</td>
</tr>
<tr>
<td>5</td>
<td>DIGITAL INTERFACE</td>
<td>A digital interface is a medium through which humans interact with computers, which can be represented through visual, auditory, or tactical.</td>
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<tr>
<td>6</td>
<td>INTERACTIVE</td>
<td>Allowing a two-way flow of information between a computer and a computer-user; responding to a user’s input.</td>
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<td>7</td>
<td>PIPELINE</td>
<td>The methodology, workflow, and process to achieve a result.</td>
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<td>8</td>
<td>CONSTRUCTIVIST LEARNING</td>
<td>Constructivist Learning is an educational learning theory that examines and explains how people might acquire and retain knowledge through active participation.</td>
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<td>9</td>
<td>INTERACTION DESIGN</td>
<td>Interaction Design focuses on the practice of designing interactive and engaging digital products, interfaces, environments, systems, and services.</td>
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<tr>
<td>10</td>
<td>USER EXPERIENCE (UX)</td>
<td>User experience focuses on how a person experiences when interacting with a digital interface or system. These systems are generally denoted by some form of human-computer interaction (HCI).</td>
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<td>11</td>
<td>PERVERSIVE COMPUTING</td>
<td>Pervasive computing regards embedding computational capability (generally in the form of microprocessors) into everyday objects to make them effectively communicate and perform useful tasks in a way that minimizes the end user’s need to interact with computers as computers.</td>
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<th>Figure</th>
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This practicum involved the adaptive reuse of The Royal Albert Arm’s Hotel, a four-storey building located on 48 Albert Street in Winnipeg, Manitoba’s culturally rich Exchange District. Through the exploration of the site’s adaptive design potential, the structure’s existing interior has been transformed into an interactive museum that aims at bridging academia, coding, and the electronic arts. The implementation of interactive design elements within the museum’s exhibits provides its visitors with a unique opportunity to investigate the impacts surrounding the integration and societal acceptance of technology, automation, and artificial intelligence (AI) systems.

The interactive museum establishes an inspiring interior for its visitors to learn, appreciate, and discover the hidden passion surrounding technology. Additionally, this museum focuses on supporting a constructivist learning environment by incorporating a digital learning centre makerspace. The significance of the makerspace will foster an interior environment that supports community engagement with those who are interested in learning, testing, and sharing knowledge. This unique space will enable visitors to engage with circuitry and become immersed through interactive learning and introducing them to varying digital tools. This space will allow visitors to touch, feel, and create new meaningful connections with technology and the museum’s message. Furthermore, the makerspace’s approach to learning has challenged the traditional methodology of a museum’s educational objectives into a dedicated environment, a space that offers engaging activities which aim to achieve inclusiveness, public engagement, participation, and creativity from the museum visitor.

Due to the rise of societal digitization and the broadening access to online collections, museums are recognizing the need to shift from being collection-centered to fostering community-centered environments that focus on meaningful engagement with their exhibited content. The primary intention of this adaptive reuse project is to create an engaging learning environment that responds to the digital era.
1.1 OUTLINE:

- In this advancing technological world, this project responded to the desire of a habitual museum audience, one that will become attached to their experiences in the museum and be motivated to return. By designing an engaging museum visitor experience, through its multitude of interior environments, this project established an interior environment that fosters constructivist learning that encourages visitors to interact with its exhibits. These experiences give attention to the application of human-computer interaction (HCI) and the integration of digital interpretive technologies in its interior environments. Simultaneously, the design respects the existing structure and adaptively uses the opportunities of the site to encourage the museum visitors to learn, engage and thoughtfully question the displayed material.

- The methodology for this practicum comprises of a theoretical framework and literature review which focuses on educational environments, the museum visitor experience, interactive and digital interface design, and constructivist learning theory. Additionally, this segment will be followed by a detailed site analysis and a study of relevant precedent studies that have influenced the design considerations and programming for the museum’s educational and interactive interior environments.
1.2 RATIONALE & CONTEXT:

- Museums have the power to frame perspectives, educate individuals and provide a space for discussion to those who visit. From personal experience, the act of visiting a museum is viewed as a leisure activity, as people have their freedom of choice to engage with a museum’s internal messages and curated content. Because museums are a cultural leisure destination, visitors must have an internal motivation to be attracted to enter the site to potentially view and experience its exhibited information and services, generating potential memories and assist them in achieving their goals for personal growth. Sadly, these significant social and cultural attractions must respond to the availability of online learning, digital resources and the growing desire for different learning styles.

- Alongside art galleries and other cultural attractions, educational museums are gradually accepting the realities and pressures surrounding digitization. In response, museums are changing their stature and purpose by adapting to modern trends, to attract and retain permanence to effectively compete with other increasingly diverse leisure activities. Traditionally, museums have implemented behaviourism learning theory in the curation of a museum’s displayed information, exhibitions and design decisions to create an educational learning environment for their visitors. This traditional model of learning frames the belief that the acquisition of new behaviours in museums is based on environmental conditions. Additionally, these dated learning models permitted museums to become an authoritative environment filled with educational displays and teaching hierarchies that simply offered opportunities for their visitors to view and memorize its presented information, but not truly engage or absorb it.

- Museums act and represent alternative educational sites that contribute to learning, but more recently, this educational role has shifted. Their identity and societal role are moving towards offering meaningful, multi-dimensional and engaging experiences, where visitors are not only coming to learn leisurely but also to have meaningful interactions with the exhibits. Because of this, the traditionally used model for museum design is transforming from a passive user experience framework to offer more hands-on and interactive educational programming with digitization. This new immersive museum programming infuses the physical environment with layered digital, virtual and artificial media, with the aims to engage the museum visitor’s emotions and attune them to their environment. Although this shift towards a different museum model of learning is developing, museums and their environments still act as cultural and social magnets, that offer potential significant impacts on their surrounding local communities.

- The act of visiting a museum would require the individual to have an interest in investing themselves in the exhibited information, as otherwise, the museum would have consequentially failed at establishing an inviting communal learning space that could generate a loyal habitual audience to support the space. This shift advocates that some museums are recognizing the need for adapting its programming into stronger social environments that no longer view education as merely conveying the information to the viewer, but is now often seamlessly transforming that same information into engaging activities which aim to achieve inclusiveness, public engagement, participation, creativity and a supportive community.

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The Interactive Museum of Technology and Digital Learning Centre’s approach to reshaping the museum experience is by generating moments of interactive and engaging involvement from its visitors. To shape these interior experiences, the museum has examined and implemented Malcolm McCullough’s theories surrounding the different levels of understanding and engaging with technology, and additionally, how people for memories through interaction. Secondly, John H. Falk and Lynne Dierking’s Museum Visitor Experience and its Contextual Model of Learning. Thirdly, Tiina Roppola’s how to design for the museum experience successfully. Fourthly, Loic Talon and Kevin Walker’s digital technologies & the museum experience, which focuses on Human-Computer Interaction (HCI) environment integration. Fifthly, the design of the interior experience explores the educational and learning theories of John Dewey. Lastly, these implemented theories, models and methods are supported by George Hein’s Constructivist Learning Theory and its seven educational principles of constructivist learning environments to establish moments of curiosity, confidence, challenge, control, play and communication in the museum’s interior. Constructivist learning theory will allow for an interactive educational environment, enabling visitors to personally construct their meaning and understanding of the displayed information by engaging with educational opportunities in the built environment and the museum’s interior.

Additionally, the design explores how interactive also, engaging interior environments can potentially provide resonant user experiences, which supports and enhances museums as an active social forum and communal learning hub. The design of the museum’s internal exhibits provides its visitors with the opportunity to investigate how technology has been integrated into society and allows them to explore the evolution, impact, and history of different code languages. Furthermore, the museum guides the visitor through a multitude of exhibits featuring an examination on prominent figures within technology, the impact of computer programming and the ethical dilemma of automation, artificial intelligence and online privacy has had on society. The arrangement of the interactive exhibits additionally enables the visitor to establish, construct and input their own visible opinion or voice into the museum’s present system of organization by offering an inclusive museum visitor experience to help form a strong bond towards the interior environment.

Alongside these interactive exhibition spaces, 48 Albert Street will be supported financially by accommodating a fully equipped makerspace on its third level. The benefits of the makerspace will provide an educational space that is welcoming and inviting to all the museum visitors. The integration of human-computer interactions (HCI) in The Interactive Museum of Technology and Digital Learning Centre’s interior environments encourages its visitors to learn passionately with the engaging information, allowing for moments of content exchange between the museum and the visitor. The museum’s subsequent design generates a potential for permanency to attract an audience and an active community of habitual visitors who care about the structure’s exhibits, objects, and the message that it presents.

1.3 QUESTIONS OF INQUIRY:

The following questions acted as a catalyst for this project:

1.3.1 How are museums currently being transformed into public gathering spaces, and how can their interiors form new connections with its occupants through digital media and developing technologies?

1.3.2 How can interactive design help facilitate the need for a place of a forum for the museum’s visitors and occupants?

1.3.3 What design strategies could be employed to enhance occupant experience within the museum interior and exhibition space?
1.4 METHODOLOGY:

The design inquiry and methodology surrounding the development of this practicum includes a literature review, precedent analysis, site analysis and programming, as illustrated in the following:

1. The first investigation is a comprehensive literature review of resources discussing the museum visitor experience, implementation of educational theories, the integration of human-computer interaction (HCI) and immersive design elements to better understand the changing dynamics and direction of museum design.

2. Secondly, the analysis of the site’s existing opportunities and constraints are filtered through Graeme Brooker and Sally Stone’s series of adaptive reuse strategies. The application of their three design principles: analysis, strategy, and tactics are utilized during the programming phase to adaptively re-use the existing characteristics of the site and remodel it to suit its new function and more effectively serve the new museum’s occupants.

3. Lastly, the importance of the design and programming of the interactive museum considers appropriate facility strategies which address the following: functional community programs, required internal operations, optimal occupant experience, needs of the museum’s different targeted audiences, and to conclude the security of the museum’s collections and its conservation methods.

1.5 PROJECT OBJECTIVES:

- This project’s objectives focuses upon how the interior design of a museum can influence and help visitors who come from different learning levels to equally engage with its exhibited dialogue and be able to take something from the environment’s rich, resonant and interactive experiences. Although museums offer large amounts of information that they wish to share, the context of how information is presented must be shared strategically to enable its occupants to have a positive learning experience and encourage them to explore the interior space’s objects further and engaging exhibited information.

- Secondly, this project further examines how museums and exhibit galleries have implemented successful interactive design methods to better accommodate and facilitate an accessible and educational environment for its occupants; to help create a sense of community, gathering place and forum for its audience to meet, exchange ideas and collaborate. The design of this museum utilizes Malcolm McCullough’s readings on digitally integrated environments to inform the interactive exhibits. The developing field of interaction design is the study of how people learn, operate, and assimilate digital interfaces through the influence of technology.

- Moreover, the museum’s interior programming concentrates on meaningful, interactive, and shared experiences that transparently reflect how technology has impacted society. The built environment is becoming augmented through the implementation of digital information in its interior. The curation and implementation of these interactive spaces in the museums have been explored through a virtual environment to help assist in investigating the significant role of the body, importance regarding designing with the human senses in mind and develop appropriate interactive design choices for the museum visitor experience. The utilization of Virtual Reality (VR) in the design phase of this museum has provided new perspectives, generated quick feedback and insight regarding design implementation and scale relations of interior elements.

- Lastly, the importance of the design and programming of the interactive museum considers appropriate facility strategies that address required internal operations, optimal occupant experience, needs of the museum’s different targeted audiences, the security of the collections and its conservation methods.

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2.1 THEORETICAL FRAMEWORK DIAGRAM:

FIGURE 1 – THEORETICAL FRAMEWORK DIAGRAM
2.2 INTRODUCTION TO CHAPTER:

This chapter serves as the analytical literature review that results in a conceptual framework to guide and support the design and design decisions of the museum’s interior and exhibition spaces. As illustrated in figure 1, the subsequent investigation was carefully selected to frame a habitual museum audience, one that will continue to return to the site because of their experiences with the educational programming. This Interactive Museum of Technology and Digital Learning Centre aims at enabling rich, resonant, and interactive experiences that drive visitor engagement and learning to promote a sense of place and community.

The first section introduces Malcolm McCullough’s concept of Digital Ground, where he examines how environments are becoming layered with digital systems that support, monitor, and connect us. Additionally, the book explores aspects of individual learning and how digital dimensions aim to generate moments of interactivity. This exploration can be applied and related to the museum visitor experience, as the benefits of utilizing and exploring the integration of human-computer interfaces (HCI) and virtual reality (VR) in our environments can provide a flexible and customizable museum visitor experiences that transform a passive museum visitor into an active and engaged learner. This is furthered by how human-computer interaction can potentially strengthen an individual’s view on the significance of place and community through engaging, technologic, and embodied learning experiences.

The second section looks at John Falk’s and Lynn Dierking’s theoretical framework called the Contextual Model of Learning. This framework examines and aims at understanding why people desire to go to museums, how visitors act, and how people establish meaning from their experiences within the exhibited content. Additionally, this framework analyzes the museum experience through Falk’s and Dierking’s three contexts: personal, physical, and socio-cultural to recognize the complexities of fostering moments of social interactions and experiences within museums. Their investigation of the field provides a way for the interactive museum to organize the complexity of how people act within a museum, allowing to contextually consider the relevant differences and interaction factors regarding the museum visitor experience.

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16 Ibid.
The third section analyzes Tiina Roppola’s examination of Witcomb’s three interactivity categories that inform designing positive museum visitor experience: the spatial, the technical and the dialogic. The categorization of these interactive categories assists the re-evaluation, preservation, and impact of how its visitors perceive experiences in museums.

The fourth section discusses the future of museum experiences and how to design purposeful exhibitions under the lens of crowds, ecosystems, and integrated digital technologies. Furthermore, this segment looks at categorizing visitor profiles to understand better how to design museums for its diverse group of visitors by utilizing George Siemens’ three levels of user engagement: awareness, curiosity, and involvement. These levels are supported by Saffer’s four approaches to interaction design, to acknowledge better how visitors can form moments of co-authorship with the museum experience.

The fifth section analyzes George E. Hein’s Constructivist Theory in museums, by examining his principles of learning. The applied educational principles promote museum visitors to have an active learning and immersed experiences through constructed, educational and personal narratives formed from hands-on and interactive engagement, allowing museum visitors to have the opportunity to create meaningful connections with the exhibited subject matter and the built environment.

Lastly, the final section explores John Dewey’s Experiential Learning theory that discusses the relationship between experience and education. This theory was investigated to recognize better how museum visitors can have positive experiences with the exhibits, delving into what people desire and expect to learn from their educational experiences within museums.

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2.3 DIGITAL GROUND: ARCHITECTURE, PERVERSIVE COMPUTING, & ENVIRONMENTAL KNOWING

MALCOLM McCULLOUGH

There is no denying the fact that society is in acceptance of our environments becoming layered with digital systems that support, monitor, protect and connect us. Culturally, an individual’s spatial relationship onto a particular setting relates to humanities deepening the sense of our connectedness to the land, as places are less defined by their unique locations, landmarks, and communities than by the meaningful experiences formed within them. According to preliminary research, there is an interrelationship between the significance of place, community and, technology, as outlined by author’s notion of interaction design.

The concept of Digital Ground represents a proposition that our physical environments are becoming layered with invisible technologies and, how interactive technologies can create and strengthen the value of environments for communities through embodied learning methods. The application of Digital Ground towards the museum visitor experience generates a conversation of how integrated environments can influence how people learn, operate and assimilate information through technologic interfaces to create meaningful experiences and support the development of a collective sense of place.

Digital Ground aims at addressing how interaction design must serve the needs of the occupant, to effectively allow the individual to become absorbed into place and align with their motivations. McCullough suggests that interaction design is a method of connecting individuals with a place, and by design, it is possible to shape an occupant’s desire to connect with their surroundings. To establish a stronger sense of place the definition of community has to transform from its traditional meaning of any aggregation of people through proximal location and should be defined based on the sharing of goals through active participation. The concentration of establishing moments of active participation by incorporating human-computer interactions within the museum supports the museum visitor and their local responses to form individual memories through object permanence, spatial configurations and internal exhibitions. Furthermore, an occupant’s motivation and defined perceptions of an environment involve personal discoveries. These notions reflect that each museum visitor is an individual and will have an independent interpretation of the given environment experiences, that will help form memories.

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As defined in figure 2, there are several types of connected technologies that can be implemented into an environment to influence and support how users engage with spaces. Because the value of a space emerges from embodied learning and interactive experiences between user and environment, the type of connected technologies implemented in the museum shall influence and affect how visitors can create a connection to form a stronger sense of place with the theme and exhibits. 

A museum’s visitor experience should not be outlined, interpreted, or understood as having a singular design solution, as there is a multitude of different types of museum visitors and learners to acknowledge. Specifically, John Falk, in collaboration with Lynn Dierking, deconstructed the perceived role of a museum as being a series of fixed and stable events, suggesting that in today’s society there is a need for stronger generation of learning and constructed meaning through its spaces. To better understand why visitors should seek this museum as a place of interest, the following framework has been introduced to examine the importance of museum experience. John Falk and Lynn Dierking’s Contextual Model of Learning establishes an understanding of the museum experience through three overlapping framed contexts: a personal context, a physical context, and a socio-cultural context.

Museums offer the public significant educational value, but they also have limitations. As explored by Falk and Dierking, many museum experiences are travelling exhibitions. These exhibitions are transitory, allowing an individual who visits a museum multiple times in their life only one chance to learn, absorb and experience the exhibition. As identified by Falk and Dierking, learning is a process and product of interactions between these three contexts. This model presents the museum experience through the lens of the visitor and aims at framing why people desire to go to museums, how visitors may act, and how people establish meaning from their experiences with the exhibited content. Given the diversity among visitors and multitude of expectations, the design of the museum’s exhibitions looks to these three contexts as a method for defining engaging, goal-driven experiences relative to all visitors.


Ibid, 301.
PERSONAL CONTEXT:

The personal context, concerning the museum experience, frames a visitor’s individuality and development level, including their differences in individual interests, attitudes, and motivations for visiting a museum. This context evokes the notion that the museum should support a diverse set of opportunities for individuals to seek self-fulfillment, as their unique characteristics shape what experiences they are seeking from the museum itself. Each visitor would be arriving with a pre-defined set of interests, desires, beliefs, expectations and needs for what the museum visit would entail. These personal variables allow museums to support visitors personal objectives and “narratives that support memories of the visit that typically lasts weeks, months, and even years.” This context illustrates that a museum visitor is a diverse group of individuals with different cultural and economic backgrounds that will potentially have different goals, objectives and attitudes during and after their museum experience.

PHYSICAL CONTEXT:

The physical context envelops the architecture and feeling that the building conveys through the use of its objects and exhibited environments. Audience research has revealed that the use of media in the physical context of science centres that several factors seem to influence how visitors in museums interact with engaging environments. As explored by Falk and Dierking, the physical environment affects how museum visitors to act, move and observe, while they are exploring the museum’s interior. Additionally, the physical context in which the object or media is experienced is an essential factor when considering the value of engagement. Falk and Dierking believe that “if a film or interactive element is in a busy corridor, with no alcove or space set aside for people to view it, and no place for people to sit, visitors will be uncomfortable, and fewer will view these presentations in their entirety.” This context suggests that the architectural and design features, including the exhibitions, objects, and other interpretive materials and digital-media, influence how people respond to experiences and impact how visitors absorb displayed information.
SOCIO-CULTURAL CONTEXT:

Museum’s act as a vibrant social environment that can facilitate moments of personalized engagement for its diverse group of visitors. The socio-cultural context recognizes the complexities surrounding the museum experience, suggesting that all visitors will engage in behaviours that are unique to themselves. Because each visitor is different or may experience the museum environment differently, the dialogic approach to the construction of learning and memory in science museums shoulder respect an individual’s desire and their free-choice. This appropriation is an active process where the museum visitor constructs their meaning of the museum experience, and thus the museum’s message is converted into the visitor’s understanding. Additionally, this context envelops the social aspect surrounding the wide-range museum visitors types, including families, adults, school groups, and other organized groups. Even though individuals may be visiting alone, the social interactions that museums offer, including questions and discussions that are typically generated by engaging with the exhibitions, invite the surrounding parties to become a part of a museum’s sociocultural environment.

REFLECTION:

As more information is becoming available online, museums require to attract and facilitate moments of curiosity within their interior environments. By recognizing the complexities surrounding the museum experience, Falk and Dierking’s Contextual Model of Learning offers recommendations and guidelines for this interactive museum and digital learning centre to help assess and successfully plan dynamic, interactive and engaging experiences amongst the museum visitor, the built-environment and socio-cultural communities.

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37 Ibid, 7.
2.5 DESIGNING FOR THE MUSEUM VISITOR EXPERIENCE
Tiina Roppola

The museum visit is a multi-dimensional experience that encompasses three intersectional contexts: the first is an individual's interests, expectations, and prior knowledge, the second is an outside influence and broader social-cultural factors and lastly is the immediate physical environment and location. Through extensive interviews and qualitative analysis of the visitor experience, Tiina Roppola has expanded upon the three intersectional contexts, providing additional insight on how designing for the museum visitor experience requires an understanding into the perspective of how people actively engage with multi-faceted communication environments.

Museums offer people an opportunity to not only have educational experiences that help them discover the world but also allow them to explore and engage with the material physically. Through the lens of the museum visitor, Roppola identifies four ways in which the visitor experience is commonly constructed and mobilized in the context of a museum environment. As indicated in figure 3, the experience is a co-produced interrelationship between environment and person. This perspective supports that opportunity for exploration and engagement within an educational and learning environment allows the museum visitor to produce meaningful, first-hand experiences through hands-on and interactive exhibits.

By facilitating moments of learning through hands-on experiences within a museum, exhibitions become platforms for visitors to experiment and deepen their understandings surrounding the subject matter. This act of discovery is expressed through the visitor's response of engagement, where both the exhibit and visitor are placed in roles of senders and receivers. This system of participation between exhibition and museum visitor is obligatorily required, as interactive features have been described as physical, direct and creating invisible dialogue exchanges. This visitor relationship with the museum environment is theorized by Roppola to have three approaches through Andrea Witcomb's Concept of Interactivity.

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EXPERIENCE IN MUSEUMS

<table>
<thead>
<tr>
<th></th>
<th>Experience in Museums</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Experience is employed to reflect the multi-dimensionality of museum visiting.</td>
</tr>
<tr>
<td>2</td>
<td>To foreground, the experience can suggest an alliance with particular views of learning.</td>
</tr>
<tr>
<td>3</td>
<td>Experience is used to acknowledge the co-produced relationship between visitor and museum.</td>
</tr>
<tr>
<td>4</td>
<td>Importance of maximizing emergent experiences.</td>
</tr>
</tbody>
</table>

Figure 3 - Source: Roppola, Tiina. “Designing for the museum visitor experience.” New York: Routledge, “experience in museums”, 2014. Table.

---

WITCOMB’S CONCEPT OF INTERACTIVITY:

The purposeful role of Witcomb’s Concept of Interactivity regarding the design of the museum visitor experience aims at creating an experience that generates an emotional connection for the visitor to the exhibitions, by establishing moments of curiosity, excitement, openness, and potentially touching the viewer’s heart and or mind.\(^6\) The following three approaches to interactivity deal with these moments, allowing the museum visitor to become actors, people who actively engage with the exhibited spaces.

Witcomb’s first approach to interactivity is technical or technological. This approach frames the museum visitor’s physical participation with the museum environment through the individual’s engagement with the electronic multi-media systems, generating moments of connection to the interior.\(^1\) Although a visitor’s actions depend on their individuality, by establishing a narrative using interior design elements illustrates how curated environments can potentially affect how people perceive and behave in space.

The second approach is the spatial interactivity. This aspect allows the visitor to become part of the space as a coauthor by inviting them to establish, create and produce individual and authentic connections to the exhibitions.\(^2\) Whether visitors can read an environment’s cues, it is structured programming of place that supports the visitor’s ability to explore, engage and learn.

The third approach to interactivity is dialogic. This approach frames how the museum visitor may have an emotional connection with the interior environment’s curated experiences or interactive designs.\(^3\) Furthermore, the dialogic approach to interactivity allows the museum visitor to play the role of an actor, presenting themselves to the space and potentially creating a forum with the other occupants.

REFLECTION:

In Reflection, designing for the museum visitor experience and these approaches to interactivity illustrates how interactive design, within a museum setting, can be achieved through moments of engagement and activities within the built environment. Additionally, these approaches invite visitors to explore the interior environments to form meaningful relationships with the curated objects, selected spaces and deeper embedded meanings, as this connection would not be dependent on the medium or media, only how it is to be discovered and engaged by the user.

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\(^2\) Ibid, 131-141.

\(^3\) Ibid, 156-164.
Museums offer a public service to society and are part of a vibrant visual culture. This visual culture, when investigated through its vibrant displays, circulated artworks, dedicated exhibitions, and embedded narrative objects can inspire individuals, provoke new perspectives, and evoke an emotional sensibility surrounding important events, ideas, and cultural stories. Although this service is primarily visual, museums should reflect and shift from these traditional transmission models of teaching and learning by embracing more open participation within its exhibits. This section involves future methodology and perspectives regarding experience design in museums. Because of the benefits of exploring interactive opportunities and engaging the public to attract larger audiences, museums are shifting from being primarily collection focused to visitor experience focused. This generates possible rewarding learning experiences for a museum, that fosters engaging, community sensibilities and interactive experiences.

New types of museum experiences gradually emerged and took hold of this perspective. As technology evolves, the degree of sophistication and immersion has allowed the museum experience to incorporate and integrate interactive and digital media to increase visitor engagement and participation through the use of new media, such as video games, interactive installations and other forms of entertainment. These forms of experience design methods help encourage visitors to engage and experiment with the exhibited content, generating a museum experience that is meaningful and memorable.
Although designing for engaging experiences within museums is good; visitors will act according to their individuality and goals. As conducted by the Dallas Museum of Art, a model for understanding visitor participation and interaction was developed. Their findings indicate that “regardless of age, educational level, socioeconomic standing, or ethnic background, visitors” can be categorized by one of the following profiles: Aware, Curious, Committee. As indicated in Figure 4, these visitor profiles can be linked to George Siemens levels of connection and engagement: Awareness and Receptivity, Connection and Forming and, Contribution and Involvement. These visitor profiles have helped frame the development of the interior programming and interactive curation of the museum by establishing who visits a museum and how they may potentially act within the environment.

<table>
<thead>
<tr>
<th>VISITOR PROFILES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. AWARE</td>
</tr>
<tr>
<td>Visitors with little or no experience. The learner becomes conscious of new informational nodes and recognizes sources of meaning.</td>
</tr>
<tr>
<td>2. CURIOUS</td>
</tr>
<tr>
<td>Visitors who enjoy the social dimension of the museum experience. Learner begins to form connections and utilizes resources to expand knowledge.</td>
</tr>
<tr>
<td>3. COMMITTEE</td>
</tr>
<tr>
<td>Visitors that are enthusiasts. A learner that contributes to the museum community actively attempts to become involved and visible.</td>
</tr>
</tbody>
</table>

Forms of co-designing and co-authorship between visitor and museum experience have also taken shape through interaction design. Saffer suggests that four approaches to interaction design, each with their underlying philosophy. These types of initiatives and approaches primarily include visitor involvement and participatory experiences, allowing visitors to invest themselves in the museum experience and helps foster potential connections between the museum identity and the museum visitor. These approaches strengthen a museum’s goal to support a conversation between users and, the user and the environment. Additionally, the benefit of interactive participation within the museum experience allows the museum visitor to create personal dialogues, interactions and memories through engaging experiences and implementations of interaction design within the interior environment.

### Saffer’s Four Approaches to Interaction Design

<table>
<thead>
<tr>
<th>Approach</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>USER-CENTRED DESIGN</td>
<td>The museum visitor needs, and desires would be the primary focus of the engaging experience.</td>
</tr>
<tr>
<td>ACTIVITY-CENTRED DESIGN</td>
<td>Focuses on the requested behaviour from the user, surrounding the required activity.</td>
</tr>
<tr>
<td>SYSTEM DESIGN</td>
<td>Allows the designer to primarily focus on the overall structure and holistic solution to the interaction between user and object with disregard to how the user may feel.</td>
</tr>
<tr>
<td>GENIUS DESIGN</td>
<td>This approach relies solely on the experience and creative flair of the designer.</td>
</tr>
</tbody>
</table>

The concept of discovery in the museum experience has evolved from the simple act of visitors observing or encountering an object towards something more significant. Museum experiences are looking forward, past interactive exhibits, towards designing platforms, through the use of digital mediation, that enables a two-way dialogue between the museum visitor and a museum’s message. Additionally, museum experiences are broadening their scope to include visitor interaction more directly. Visitor interactions with museum exhibitions are expanding to include a diverse range of activities and themes, including interactive, creative, holistic, contemplative, visual and observational, employing digital mediation and other interfaces. The design implications surrounding these range of technological integrations and activities invite museums to have a larger goal, establishing multi-user interactions that foster social and collaborative platforms, enabling museums to become a place where the museum experience can feel more rewarding for visitors.

The future implementation of technologies can transform the museum experience for visitor interaction and learning in museums by drawing upon a framework that allows new museum media to harmonize with the three types of visitor profiles, museum programming and existing practices. Additionally, by designing with these four approaches to interaction design, the museum visitor will benefit from meaningful, hands-on, and interactive interpretations through digital and technologically integrated environments that help facilitate and support museum discussion. These approaches produce resonant museum visitor experiences that foster meaningful, social environments to help share a museum’s learning experience, but also challenge the established traditional object focused models of museum curation.

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57 Ibid, 4.
2.7 CONSTRUCTIVIST LEARNING THEORY IN MUSEUMS

George E. Hein

This section discusses a constructivist education perspective and its application in a museum and exhibit design, surrounding visitor acquisition and formation of knowledge and how people learn, especially in a museum environment. Constructivist learning theory focuses on activity-based learning, where learners construct knowledge as they actively engage with the material, and builds upon premises that are central to John Dewey’s Experiential Learning theory. In educational museums, this theoretical approach can be applied to address the issue of how museums can provide spaces that involve visitors, not only through its exhibited objects and their embedded meaning but also support visitors ability to create contextual connections and learning experiences. Furthermore, this section will explore the rationale for using constructivist educational practices in a museum setting and its significance surrounding the new learning opportunities that technology now affords.

There are essential relations between constructivism and how technology-supported learning environments can facilitate a meaningful museum visitor’s learning experience. Constructivism hypothesizes that learning requires active participation from the learner, suggesting the learner’s mind should be both engaged with the information they are absorbing and in the significance of the activity to reinforce how the knowledge that is acquired. Thus, when people encounter, learn and interact with their surroundings and gain new experiences, specifically the world and its various objects, the learner is posed to reconcile with the new experience by reflecting on it with their previous learnt ideas and knowledge. In other words, the learner gains knowledge by fitting new information together with their previously conceived understandings.

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CONSTRUCTIVIST LEARNING ENVIRONMENTS:

Hein views constructivist educational theory as a means for teaching and learning to focus on the needs of the learner, and not on the subject. For interactive museums, this translates that the focus should be on the visitor, generating adaptable and audience-friendly learning experiences.

Constructivist applications in an educational museum environment would require the museum visitor to form and reach conclusions that are not validated or conform to a curated depiction of truth, but rather allow the individual to sense that they were able to extract knowledge, rather than receive validation. As the museum tackles educating the museum visitor regarding computer language and technologic elements, constructivist methods will support visitors’ opportunities to play and enjoy learning through making mistakes, errors, and trials regarding their preconceptions on the exhibited interactive information. As illustrated in figure 6, to support this educational environment, the design of the museum will follow seven primary educational principles that facilitate a constructivist learning environment.

| SEVEN EDUCATIONAL PRINCIPLES OF CONSTRUCTIVIST LEARNING ENVIRONMENTS |
|-----------------|-------------------------------------------------------------------|
| 1               | To provide experience with the knowledge construction process.     |
| 2               | To provide experience in and appreciation for multiple perspectives.|
| 3               | To embed learning in realistic contexts.                          |
| 4               | To encourage ownership and a voice in the learning process.        |
| 5               | To embed learning in social experience and collaboration.          |
| 6               | To encourage the use of multiple modes of representation. (medium, |
|                 |                     video, audio text, etc.)                            |
| 7               | To encourage awareness of the knowledge construction process       |
|                 | (reflection, metacognition).                                     |

Figure 6 - Table excerpted by Honebein, P. “Seven Goals for the Design of Constructivist Learning Environments.” Constructivist Learning Environments. New York: Educational Technology Publications. 1996. 11-12.

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By applying these several educational principles of constructivist learning environments in an educational museum setting, it enables the museum visitor to freely be able to derive an understanding of the presented work, encourage social and collaborative engagements with the exhibition and create awareness towards an individual’s conceived perceptions surrounding the theme and nature of the learning subject matter.

Furthermore, the appropriate application of constructivist learning experiences in an interactive museum would feature environments and exhibitions that facilitate interactive case-studies, problem-based learning displays and human-computer input mechanisms, such as virtual reality, that would require the museum visitor to engage actively, discover, learn and reflect on the content. This tactic allows various perspectives on human factor components and visitor comfort to be presented and permits the museum audience to engage and interpret its objects via a hands-on approach, offering the learner to experiment, connect and draw new understandings and conclusions. By supporting a learner’s creative instincts to engage and interact with an educational environment, the museum visitor would have generated a stronger connection to the material, thus justifiably more likely to retain and express the newly received knowledge.

The benefits of utilizing constructivism principles in a museum setting would allow its visitors to engage and learn more while they are more actively involved, rather than being passive listeners or spectators that simply received knowledge and experiences. Constructivism prioritizes the learning experience to concentrate on the learner, so they are actively thinking about the information by attempting to construct an understanding, rather than asking the learner to memorize the presented information. Furthermore, this would allow the museum visitor to perceive the knowledge as if they have direct ownership of what they learn since constructivist learning values an individual’s questions and personal explorations. These learning initiatives and personal investments can be experienced and expressed by different types of materials and methods, such as reflections done through hands-on engagements and other physical representations or interpretations.

Additionally, the utilization of constructivism theory and its principles in a museum environment would potentially promote a more significant social forum, that would enable visitors to collaborate, exchange ideas and evaluate interpretations of the depicted materials. The application of constructivist principles in the design of this museum reinforces how interactive educational environments can facilitate stronger learning experiences, which can help generate and facilitate change in its visitors.

**REFLECTION:**

The benefits of utilizing constructivism principles in a museum setting would allow its visitors to engage and learn more while they are more actively involved, rather than being passive listeners or spectators that simply received knowledge and experiences. Constructivism prioritizes the learning experience to concentrate on the learner, so they are actively thinking about the information by attempting to construct an understanding, rather than asking the learner to memorize the presented information. Furthermore, this would allow the museum visitor to perceive the knowledge as if they have direct ownership of what they learn since constructivist learning values an individual’s questions and personal explorations. These learning initiatives and personal investments can be experienced and expressed by different types of materials and methods, such as reflections done through hands-on engagements and other physical representations or interpretations.
This section investigates John Dewey, a prominent figure in educational philosophy surrounding teaching and learning in schools, who advocated the use of a learner’s personal experience as a basis for teaching and learning rather than the behaviouristic view surrounding static learners. Although museums and schools are different typologies, the style and context of Dewey’s learning theory regarding inquiry-oriented situations can be found and utilized in both settings. Traditionally, knowledge transfer in educational environments subjugates the learner to structured subject-matter and methods that do not stress the value of personal experience. Dewey viewed the role of education as being more extensive than the traditional recitation of textbooks and mental exercises in learning, advocating principles surrounding the interaction and experiential environment. This inquiry leads experience as a basis of education, surrounding the understanding of how museum visitors engage with exhibitions to form meaningful experiences that generate moments of learning and reflection upon the learner.

There are two aspects of experience regarding museum visitors achieving intimate and educational development. The first aspect is the premise regarding Dewey’s concept of genuine education as being transmitted through experiences. Furthermore, this aspect addresses visitor interaction with the environment setting and how experience can be formed from their active engagement. The second aspect reveals that generating an experience from the interaction does not mean all experiences are equal or good, that it is dependent on the learner’s quality of the experience. These identified aspects describe the museum visitor learning experience; how they first assimilate the knowledge, then decodes it as a positive or negative experience, and then later reflect on the gained knowledge. As indicated in Figure 7, these educational aspects regarding experiences help assess the museum visitor experience and recognize appropriate learning outcomes and goals for exhibits.
EXHIBITION DESIGN & LEARNING OUTCOMES

<table>
<thead>
<tr>
<th>EXPERIENCE GOAL</th>
<th>OUTCOME GOAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex: Interactive Exhibit (Active participation with the learner)</td>
<td>1. Positive Learning Experience</td>
</tr>
<tr>
<td></td>
<td>2. Learner engages with material</td>
</tr>
<tr>
<td></td>
<td>3. Challenges Existing Knowledge</td>
</tr>
<tr>
<td></td>
<td>4. Generate Social Discussion</td>
</tr>
<tr>
<td></td>
<td>5. Knowledge absorption</td>
</tr>
<tr>
<td></td>
<td>6. Reflects on learning experience</td>
</tr>
<tr>
<td></td>
<td>7. Learner asks questions &amp; extends the inquiry</td>
</tr>
<tr>
<td></td>
<td>8. The learner takes ownership of the outcome,</td>
</tr>
<tr>
<td></td>
<td>9. Learner achieves multiple outcomes</td>
</tr>
</tbody>
</table>


REFLECTION:

- In prescribing how to accomplish positive learning experiences in educational settings, Dewey provides a concise description of what is viewed as inquiry-based learning. He believes that it is not sufficient to give people new experiences, that the experiences must present new problems that follow two conditions that foster moments of inquiry from the learner.72 The first condition indicates that “the problem grows out of the conditions of the experience being had in the present, and that it is within the range of the capacity of students.”73 The second condition indicates that the problem should inspire the learner on an active quest for further information and foster creativity within themselves.74 These two conditions will result in the museum visitor to become a habitual learner, one that is in a continuous cycle to actively engage and seek more learning experiences.

- While the programming and design of the museum exhibits may have various types of outcomes and goals, how people act and how they feel when engaging with the material is as important as what they learn. Furthermore, how people act, engage, and perceive an exhibition through their senses is a necessary point to how the museum visitor may feel, interpret, and absorb the material.

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73 Ibid, 75.
74 Ibid, 75-76.
2.9 FRAMEWORK FINDINGS

- In order for the Digital Learning Centre to successfully establish a habitual audience, one that will return and support its functions, it must apply and adapt the previously addressed theoretical theories and concepts into its internal programming. Additionally, a key aspect drawn from designing the museum visitor experience, we must incorporate spaces to foster conversation and community. Due to this reasoning, the Digital Learning Centre will incorporate a community aspect with the additions of a café on the main level. The café will act as a continual conversation space for the public and museum visitor, both before and after hours.

- These theoretical theories and concepts show that museums have new developing opportunities to create more meaningful experiences for their visitors through the application of embedded digital interfaces and mediums. Although, museums and other educational facilities cannot promise to create a connection and more in-depth understanding with all of their visitors, this integrated, habitual museum design framework, and its supporting theoretical strategies, offers a guide to creating resonate experiences within the interior environment. Most importantly, this literary investigation explores the potential of an integrated design process that utilizes interactive design and digital technologies as a core framework to promote the museum visitor experience and strengthen design elements at the human scale. As illustrated in figure 8, the subsequent investigation on aspects of a habitual museum experience has resulted in the incorporation of these design strategies.

---

<table>
<thead>
<tr>
<th>#</th>
<th>THEORIST</th>
<th>ASPECT</th>
<th>THEORY EXTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DIGITAL GROUND</td>
<td>THE INDIVIDUAL</td>
<td>ALL INDIVIDUALS HAVE DIFFERENT LEVELS OF ASSIMILATING, ENGAGING AND UNDERSTANDING TECHNOLOGIES, GENERATING VARIED PERSONAL MEMORIES OF THE INTERACTION</td>
</tr>
<tr>
<td>2</td>
<td>THE MUSEUM VISITOR EXPERIENCE</td>
<td>INTEREST</td>
<td>FALK’S AND DIERKING’S CONTEXTUAL MODEL OF LEARNING DECONSTRUCTS AND FRAMES THE MUSEUM VISITOR EXPERIENCE, EXAMINING THE PHYSICAL, PERSONAL AND SOCIO-CULTURAL ASPECTS OF THE MUSEUM VISIT.</td>
</tr>
<tr>
<td>3</td>
<td>DESIGNING FOR THE MUSEUM EXPERIENCE</td>
<td>EXPLORATION</td>
<td>EXPANDING ON FALK AND DIERKING’S DISCOURSE ON THE MUSEUM EXPERIENCE, WITCOMB’S THREE INTERACTIVITY CATEGORIES: SPATIAL, TECHNICAL AND DIALOGIC IMPACT HOW THE MUSEUM VISITOR LEARNS AND PERCEIVES EXPERIENCE.</td>
</tr>
<tr>
<td>4</td>
<td>DIGITAL TECHNOLOGIES &amp; THE MUSEUM EXPERIENCE</td>
<td>DISCOVERY</td>
<td>THE INTEGRATION AND IMPLEMENTATION OF INTERACTION DESIGN, DIGITAL TECHNOLOGIES, AND HUMAN-COMPUTER INTERACTION (HCI) IN THE PHYSICAL ENVIRONMENT CAN GENERATE POSITIVE MOMENTS OF CO-AUTHORSHIP DURING THE MUSEUM EXPERIENCE. ALLOWING MOMENTS OF AWARENESS, CURIOSITY, AND INVOLVEMENT.</td>
</tr>
<tr>
<td>5</td>
<td>CONSTRUCTIVIST LEARNING THEORY IN MUSEUMS</td>
<td>ABSORPTION</td>
<td>ACTIVITY BASED LEARNING AND IMMERSED EXPERIENCES FORMED THROUGH EDUCATIONAL AND PERSONAL NARRATIVES, SUCH AS HANDS-ON AND INTERACTIVE ENGAGEMENT CAN CREATE STRONGER ABSORPTION OF THE KNOWLEDGE PRESENTED.</td>
</tr>
<tr>
<td>6</td>
<td>EXPERIENCE AND EDUCATION</td>
<td>REFLECTION</td>
<td>THE QUALITY OF THE LEARNER’S EDUCATIONAL EXPERIENCE CAN GENERATE POTENTIAL POSITIVE OR NEGATIVE LEARNING OUTCOMES THAT AFFECT THE INDIVIDUAL’S PERSONAL INTERPRET AND ABILITY TO ABSORB THE MATERIAL.</td>
</tr>
</tbody>
</table>

**FIGURE 8 – FRAMEWORK FINDINGS**
Table Generated by the Author. Framework Findings. 2019. Table.
<table>
<thead>
<tr>
<th>DESIGN STRATEGIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ALL EXHIBITS &amp; SPACES WILL BE ACCESSIBLE FOR ALL LEVELS AND AGES OF LEARNING.</strong></td>
</tr>
<tr>
<td><strong>PURPOSEFUL IMPLEMENTATION OF INTERACTIVE TECHNOLOGIES TO STRENGTHEN THE VALUE OF ACTIVE LEARNING.</strong></td>
</tr>
<tr>
<td><strong>CONNECTED TECHNOLOGIES AND FEEDBACK INTERFACES, SUCH AS PASSIVE, CONTROL AND HAPTIC ARE IMPLEMENTED INTO THE ENVIRONMENT SETTING TO INFLUENCE AND SUPPORT HOW USERS ENGAGE.</strong></td>
</tr>
<tr>
<td><strong>STRATEGICALLY ORGANIZE THE INTERIOR EXHIBITS TO GENERATE MOMENTS OF SOCIAL INTERACTIONS BETWEEN MUSEUM VISITORS</strong></td>
</tr>
<tr>
<td><strong>IMPLEMENT A LARGE OPEN GATHERING AND MEDIA SPACE TO WELCOME AND INTRODUCE THE MUSEUM VISITORS INTO THE MUSEUM.</strong></td>
</tr>
<tr>
<td><strong>SUPPORT SPACES THAT USE FILM OR INTERACTIVE ELEMENTS WITH ALCOVES AND PLACES TO SIT TO ALLOW VISITORS TO BE COMFORTABLE WHILE EXPLORING</strong></td>
</tr>
<tr>
<td><strong>ENSURE OPTIMAL CIRCULATION BETWEEN VISITORS AND GALLERY SPACES TO ESTABLISH PLACES OF FORUM AND DISCUSSION</strong></td>
</tr>
<tr>
<td><strong>DESIGN EXHIBITIONS TO ENCOURAGE VISITORS TO BECOME CO-AUTHORS, ENABLING VISITOR VOICES TO BE HEARD.</strong></td>
</tr>
<tr>
<td><strong>DEVELOPMENT OF FORMAL AND INFORMAL SOCIAL SPACES THAT ALLOW FOR INTERACTIVE, ENGAGING AND INTERACTIONS WITH THE MUSEUM CONTEXT.</strong></td>
</tr>
<tr>
<td><strong>IMPLEMENT A MAKERSPACE WHERE MUSEUM VISITORS CAN CONTRIBUTE TO THE MUSEUM COMMUNITY AND ACTIVELY INVEST THEMSELVES IN AWARENESS, CURIOSITY, AND INVOLVEMENT.</strong></td>
</tr>
<tr>
<td><strong>DIGITAL LEARNING CENTRE TO FEATURE A RESOURCE HUB THAT ENABLES ADDITIONAL LEARNING OPTIONS.</strong></td>
</tr>
<tr>
<td><strong>SUPPORT THE LEARNER BY USING MULTIPLE MODES OF LEARNING AND REPRESENTATIONS, SUCH AS MEDIA, VIDEO, AUDIO, TEXT, TACTILE AND ACTIVE ENGAGEMENT.</strong></td>
</tr>
<tr>
<td><strong>CREATE EXHIBITIONS THAT PROVIDE OWNERSHIP AND A VOICE FOR THE MUSEUM VISITOR IN THE LEARNING PROCESS.</strong></td>
</tr>
<tr>
<td><strong>IMPLEMENT MOMENTS OF QUESTION AND REFLECTION UPON LEARNING EACH EXHIBITION AREA.</strong></td>
</tr>
<tr>
<td><strong>USE COLOUR AND PLAYFUL OPENINGS BETWEEN EXHIBITS TO INSPIRE THE LEARNER ON AN ACTIVE QUEST FOR FURTHER INFORMATION.</strong></td>
</tr>
</tbody>
</table>
3.1 INTRODUCTION TO CHAPTER

Chapter three provides a detailed description and an analysis of the physical context of the selected site. This analysis comprises of an introduction of the site and its selection rationale, an overview of the site’s context by examining the district through nodes, the site’s surrounding movement and circulation patterns, the site inventory, nearby landmarks and a breakdown of the building’s characteristics. Lastly, this comprehensive analysis serves to inform the opportunities and constraints of the site’s adaptive re-use potential and acts as a guideline for design development.
3.2 SITE SELECTION RATIONALE

The location of this museum will be the adaptive reuse of the Royal Albert Arm’s Hotel building, located on 48 Albert Street in Winnipeg, Manitoba’s historic Exchange District. As illustrated in figure 10, this site selection process followed an essential site criterion which illustrates the critical factors in selecting an appropriate site for museums.76 This criterion was formed by the Barry Lord and Gail Dexter Lord, who are the founders and presidents of Lord Cultural Resources, an international cultural planning firm who deal with planning, design, construction, renovation and expansions of public galleries and museums.77 Primarily, the site was selected due to its prominent urban location, the potential in adaptive reuse opportunities and additionally the structure’s physical configuration as a 4-storey tall building.

Winnipeg, Manitoba has been selected as the location for the facility due a 2018 report that illustrates employment in Winnipeg’s tech sector had grown nearly 40 percent faster than most of the significant Canadian tech hubs, including Vancouver, Ottawa and Montreal.78 This growth rate shows that Winnipeg’s tech industry has the potential to emerge as a regional tech hub, which in turn supports the setting for this museum selection.

SITE SELECTION CRITERIA KEY FACTORS

<table>
<thead>
<tr>
<th></th>
<th>Planning adequate delivery space and ease of access for full-size delivery vehicles.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Ease of access for school and client entry</td>
</tr>
<tr>
<td>3</td>
<td>Provision of adequately dimensions museum object routes</td>
</tr>
<tr>
<td>4</td>
<td>Provision of suitable fire protection</td>
</tr>
<tr>
<td>5</td>
<td>Fire and smoke separation and mean of escape</td>
</tr>
<tr>
<td>6</td>
<td>Provision of an integral vapour barrier that allows internal areas to be suitably climate-controlled</td>
</tr>
<tr>
<td>7</td>
<td>Inclusion optimized routes for electrical and data cabling</td>
</tr>
<tr>
<td>8</td>
<td>Segregation of wet services to minimize the risk of accidental water damage to museum objects</td>
</tr>
<tr>
<td>9</td>
<td>Appropriate on-site and off-site storage space.</td>
</tr>
<tr>
<td>10</td>
<td>Appropriate relationships between different functional areas because of suitably sized spaces</td>
</tr>
<tr>
<td>11</td>
<td>Optimal daylighting and views if required</td>
</tr>
<tr>
<td>12</td>
<td>Adequate parking for museum visitors</td>
</tr>
<tr>
<td>13</td>
<td>Availability for optimal internal circulation</td>
</tr>
<tr>
<td>14</td>
<td>Adaptive reuse opportunities and structural envelope</td>
</tr>
<tr>
<td>15</td>
<td>Prominent urban location</td>
</tr>
</tbody>
</table>

Figure 10 - Table Generated by the Author. Site Selection Criteria Key Factors. 2019. Table.

FIGURE 11 - SITE DIAGRAM
IMAGE BY AUTHOR. SITE DIAGRAM. 2019. VISUAL IMAGE.
3.3 SITE CONTEXT: NODES, DISTRICTS & LANDMARKS

The historic Royal Albert Building symbolizes an overlooked structure due to the primary paths and channels that people move along. Approximately 90,000 people work, thrive and live in downtown Winnipeg, many of which would travel along Main Street and Portage avenue as part of their daily routine. Although there are significant articles and circulation routes which surround the site, Albert Street hardly appears to attract movement outside of pedestrian traffic and vehicles attempting to look for parking.

Evidence of this struggle for revitalizing Albert Street is acknowledged by the City of Winnipeg’s planning group and the site’s surrounding stakeholders. They suggest reviving this downtown area by converting Albert Street into something similar to Ottawa’s Sparks Street Mall and transforming it into a permanent or seasonal pedestrian mall, as it would yield a significant impact on pedestrian circulation and revitalize the street’s use. Furthermore, as illustrated in figure 12, the museum would benefit from the multitude of pedestrian access points and circulation routes to and from the site’s nearby landmarks, due to the site’s surrounding contexts.

FIGURE 12 - LANDMARKS DIAGRAM
IMAGE BY AUTHOR. LANDMARKS DIAGRAM. 2019. VISUAL IMAGE.

The selected site is a national historic district filled with repurposed century-old warehouses. As reported by Ryan Behie, vice-president and 2018 managing director of CBRE, Winnipeg’s downtown stakeholders and institutions like Red River College must align their forces and create an environment that further attracts the young and elderly to live, work and play in the Exchange District. The stakeholders and businesses within the area have allowed Winnipeg’s Exchange District to transform the downtown area into a trendy urban environment that attracts clusters of individuals to support the site’s businesses, education institutions, entertainment and economy.

As illustrated in figure 13, the selected site benefits from this location as more than twenty percent of Winnipeg’s creative industries are located in its downtown area and additionally offers related events that attract up to 2.95 million visits annually. The adaptive reuse of 48 Albert Street would benefit from this large gathering of people inside and outside of the city who visit the downtown Winnipeg districts for leisure and business.
LOCATION:

Based on the site’s surrounding tech-industry resources and neighbouring communities, 48 Albert Street has been identified as an optimal location, due to the opportunities that it has presented to support continued learning and educational programs. As illustrated in figure 14, The Royal Albert Arms Hotel, located on 48 Albert Street, is situated between neighbouring tall office and commercial buildings that shadow over 48 Albert Street. Adjacent to the site lies two parking lots, and a parkade occupies the lots immediately to the south and west of the building.

PARKING:

The Exchange District is scattered with distant parkades and parking lots that are hidden between the district’s structures. The location of the selected site is adjacent to a large public parkade that services the local commercial businesses and downtown commuters.

EDUCATION & LEARNING INSTITUTIONS:

Furthermore, the Exchange District is surrounded by several educational and cultural centres, such as the Red River College, University of Winnipeg, Manitoba Museum and Artspace Inc., that can assist in attracting individuals who share a similar interest in leisure, technology, creative social gatherings and educational programs. As illustrated in figure 15, the selected site is located near over 32 tech businesses, educational facilities, and museums within a 2000m distance that will attract and generate an efficient audience to the downtown area.
3.4 SITE CONTEXT: LOCATION

SITE:  
Country: Canada  
Sub-region: Northern America  
Region: Winnipeg, Manitoba  
Latitude: +49.88 (49°52'48"N)  
Longitude: -97.17 (97°10'12"W)  
Time zone: UTC-6 hours  
Altitude: ~230 m

WIND  
Wind Direction: Prevailing South Winds  
Wind Speed: Average 90 km/h ±

TEMPERATURE AVERAGE:  
Winter: -14.20 °C±  
Spring: 11.37 °C±  
Summer: 17.20 °C±  
Autumn: 4.22 °C±

FIGURE 16: 48 ALBERT STREET FRONT PROFILE
Image by Author, 48 Albert Street Front Profile. 2019. Photograph.

85 Ibid.
FIGURE 17 -
SUN PATH & WIND DIAGRAM
IMAGE BY AUTHOR. SUN PATH & WIND DIAGRAM. 2019 VISUAL IMAGE.
3.5 SITE CONTEXT: PATHS & EDGES

- The qualities that an adaptive structure possesses was one of the significant criteria in site selection. The structure required a direct connection with the public, one that captures the essence in which a museum should be to foster a relationship with its surrounding communities, allowing people to congregate, socialize and discuss important matters. Additionally, the selected site is located a short distance from Portage Avenue and Main Street, which act as the City of Winnipeg’s central crossroads, permitting the site to generate potential direct connections with the downtown audience.

- Good pedestrian access to and from the selected site is a major priority to ensure efficient internal operations regarding access to the museum. Primary pedestrian spines include highly travelled sidewalks and paths that link to the site’s surrounding three districts: Portage & Main, Portage-Bilice and the Exchange District.

FIGURE 18 - PARKING & PATHS DIAGRAM
IMAGE BY AUTHOR. PARKING & PATHS DIAGRAM. 2019. VISUAL IMAGE.
ARCHITECTURE & HISTORY:

- Opened in 1913, Architect Edgar D. McGuire designed the four-storey Royal Albert Arm’s Hotel, a structure which originally contained three conventional parlours, centrally located washrooms and 53 private rooms on its upper three floors. As represented in figure 20, the original drawing set and plans illustrate the spatial adjacencies between rooms and do not include any detailed drawings or depictions of the building’s interior. From the existing measurements and new addition to the foyer, the structure is roughly sized at 1900± m².

- Additionally, the structure’s basement cavity will be utilized for its existing mechanical and furnace room and due to this will be omitted from the design scope. Initially, 48 Albert Street was constructed in downtown Winnipeg to lodge arrivals that came looking for new opportunities. In its later years, 48 Albert Street transformed these dated hotel rooms into single room occupancy suites on its upper floors. Furthermore, the renovation featured a central gathering space on the main level that established an infamous downtown venue location for music and nightlife.

**FIGURE 19: 48 ALBERT STREET ATRIUM**

Image by Author. 48 ALBERT STREET ATRIUM. 2019. Photograph.

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FIGURE 20 – EXISTING FLOOR PLANS

3.7 BUILDING ANALYSIS: ADAPTIVE REUSE

HISTORIC DESIGNATION & ADAPTIVE REUSE:

- The historic designation of the Royal Albert Arm’s Hotel is listed as a Grade III Municipally Designated Site in 1981. The objectives of a Grade III site is to prevent the demolition, removal, alteration or repair of the building, erection or structure unless and until shown to be necessary to the satisfaction of the Designated Committee. This designation protects the modification of any alterations to the exterior of the building, as it is under protection by the City of Winnipeg’s Historical Resources By-Law No. 55/2014.

- This indicates that any proposed alterations to the exterior character of the building would be subjected to a review by the City’s Historical Buildings Committee. Additionally, the Royal Albert Arm’s Hotel is located in the Character Sector, in the Downtown Winnipeg Zoning By-law No. 100/2004, which deems that any building in this sector that is undergoing changes must adhere to set guidelines set out expressly for the Exchange District. These guidelines aim at encouraging design compatibility and adjustments which reinforce the valued surrounding building qualities and enhancing pedestrian comfort within the Exchange District.

---

EXTERIOR CHARACTERISTICS:

The Royal Albert Hotel’s exterior has been modified to some extent since its construction. Its roof has been updated from a red tile and was replaced with metal panelling. The structure’s main entrance has been moved to the northernmost window opening to allow for a glass atrium to be added and approved in the 1990s. The front façade of the structure features concrete lintels and finely carved stone detailing that includes raised lettering, which reads Royal Albert, above the centred arched window.

These engravings help frame the structure’s symmetrical front façade windows and brickwork. The structure’s rear features an exterior fire escape staircase and loading zone. The structure’s west wall features a prominent ghost sign, that reads the building’s original name. This ghost sign will remain, as its heritage designation protects it. Additionally, the outer structure is prominently painted brick with an array of wood-framed windows.

FIGURE 22
EXISTING FAÇADE


ADAPTIVE REUSE INTRODUCTION:

- When remodelling a structure’s interior environment that has previously been designed and constructed for a different typology or occupancy use, the significant value placed in an adaptive reuse analysis and the study of the site’s existing context, history, and supportive elements helps informs potential design strategy opportunities regarding the site’s characteristics.\(^{96}\)

- To appropriately reuse 48 Albert Street and adaptively remodel the structure’s interior, Graeme Brooker’s and Sally Stone’s adaptive reuse framework, which consists of the following three design principles: analysis, strategy and tactics,\(^{97}\) has been utilized to suit its new programme, function and better to serve the museum visitor experience better.

- By reading the intrinsic qualities, which are embedded within an existing structure’s interior environment, it has assisted in the ability to identify suitable strategies and help in suggesting the following site-appropriate design tactics.\(^{98}\) Additionally, the following adaptive reuse framework has proven useful in confirming the required criteria regarding an appropriate site selection for this interactive museum and digital learning centre.

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INTERIOR ANALYSIS:

- The analysis of 48 Albert Street has exposed the quality, characteristics and embedded history regarding the relationship space has with its present adjacencies, embedded qualities found through materials, and additionally the orientation and position of doors, windows, and objects. The analysis of these elements has contributed to the overall composition and informed the context of the existing structure. Characteristics and aspects found during this analysis have been thoroughly analyzed to give an interpretation of the space, generating possible strategies and tactics for its adaptive remodel.

- As identified in figure 24, the main floor features detailed wainscoting woodwork and delicate mouldings throughout. Furthermore, the interior features a pressed tin ceiling tile, plastered ceiling, and a front facade glass atrium located at the main entrance. The main floor presently has had newly installed hardwood flooring in the foyer and features exposed concrete floor in the old bar venue area. The space additionally features a central circulation with its staircase and elevator, allowing for a functional layout on its three upper floors. These floors each have communal water closets that are stacked. 48 Albert Street’s large South-West walls feature frequent window openings, providing an abundance of direct daylight and lovely downtown views towards Notre Dame and Portage Avenue skyline.

- Presently, the HVAC and other systems are exposed and filtered through the partially exposed and plastered painted ceiling. These ceilings look dated and unmaintained and will require appropriate treatment. Additionally, the structure’s basement provides ample space for existing mechanical and electrical systems and can provide space for additional onsite storage for exhibition rotation.

FIGURE 24 - EXISTING INTERIOR DETAILING
INTERIOR STRATEGY:

- Adaptative reuse and strategies effects how the museum’s objects communicate meaning and assist in encouraging an engaging audience to absorb its curated experiences. As the museum environments host experiences, these experiences would be influenced by the interior design.

- From the analysis, the findings above have identified opportunities for optimal lighting from the vast array of windows and openings along the western wall. There is opportune potential in revitalizing the existing flooring and ceiling elements, to make them support and frame the interior environments new typology. Additionally, the structure’s exposed material qualities, such as the brickwork and partial ceiling elements, can assist in establishing a friendly and inviting setting to support the museum’s objects and experiences.

- The opportunities found in the front glass atrium allows for more circulation options for the main entrance. This space can prove useful if large groups need to regroup or to organize themselves before entering the museum’s interior environment collectively.
INTERIOR TACTICS:

- The process of adapting the existing interior environment to fulfill the relevant vital factors, motivations and museum evaluation criteria requirements is about finding a balance between elements of the past and the future, as “the past provides the already written, the marked ‘canvas’ on which continuous remodelling will find its own place.” 99 This process of altering a structure begins by comparing the original use or function of the space to the significant alterations required by its new role and typology.100 It was determined that the adaptive re-use of the current interior environment stresses the creation of a central core and new partitions to fulfill the requirements of the museum typology, forming new circulation routes that will significantly change and challenge the existing relationship with the interior.

- Additionally, the museum will be using the tactic of framing. As illustrated in figure 26 the existing elements throughout the structure, such as the wood wainscoting and plaster moulding will be respected and utilized suitably to frame the museum’s interventions, additions and exhibition elements, due to their sharp contrast, materiality and colour.

FIGURE 26
EXISTING FOYER
Image by Author.

CH4.0 _________ PRECEDENT STUDIES
### 4.1 ARS ELECTRONIC CENTER

<table>
<thead>
<tr>
<th>Project Title</th>
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<tbody>
<tr>
<td>Location</td>
<td>Linz, Austria</td>
</tr>
<tr>
<td>Typology</td>
<td>Museum</td>
</tr>
<tr>
<td>Project Year</td>
<td>2009</td>
</tr>
<tr>
<td>Architecture Group</td>
<td>TREUSCH Architecture</td>
</tr>
<tr>
<td>Size</td>
<td>4 Storey and Extended Structure</td>
</tr>
<tr>
<td>Gross Area</td>
<td>114,000± SQ.FT.</td>
</tr>
<tr>
<td>Net Area</td>
<td>54,500± SQ.FT.</td>
</tr>
</tbody>
</table>

**FIGURE 27 - ARS ELECTRONIC INTERIOR EXHIBITION SPACE**

The Ars Electronica Center is an interactive museum which focuses on the impact of biotechnology, genetic engineering, neurology, robotics, prosthetics, and digital media in society. The center aims at generating new perspectives for its occupants regarding how people interact and communicate with their surroundings through these expanding technologies.

The structure is superimposed on an existing building from 1996 and utilizes a glass cladding to hide its previous identity and old architectural history. Additionally, the structure’s glass façade has a second purpose. The glass is framed and illuminated with coloured LED lighting on all sides of each glazed panel, allowing visitors to manipulate and control the exterior lighting system to create their own individual illuminated show during the evening.

---


ANALYSIS:

The interior of the space is a hands-on experience, where visitors have the opportunity to explore an extensive set of methodological tools. These tools provide the center’s occupants with many approaches, and ways of viewing the current challenges society is facing within these technological and scientific domains. The exhibits on display within the center provide an opportunity for interaction and participation with the curated spaces, enticing the guests to have a hands-on experience.

The structure features exhibition spaces, a Future Lab participation workshop which depicts the current reach of technologies, and a virtual reality theatre that offers a variety of panorama micro-videos. These spaces are enhanced by embedded technology that is muted within the design language of the space. As illustrated in figure 28, the circulation elements, such as the site’s stairs, ramps and connections, are centralized and utilize bright colours to provide efficient ease of access to the elements through the array of spaces.

FIGURE 28 - ARS ELECTRONIC CENTRAL CIRCULATION

DESIGN CONSIDERATIONS & RELEVANCE:

The interior interventions in this project have allowed the original structure to be revitalized. The importance of its existing characteristics was integrated appropriately to pair nicely with the new elements, allowing a new interior experience to be had.

The use of materials and colours of the Ars Electronic Centre has greatly influenced the materiality of 48 Albert Street’s design, as their application of materials establishes a juxtaposition between key spaces. Areas that are more public use bright and colourful elements to highlight key structural elements, allowing the public, who are new to the space, to be reminded and identify where they are. The use of more saturated material palette would be applied in the exhibition spaces, as this is to acknowledge the glow of different digital interfaces and blue light. The spatial literacy of the museum creates a proper balance between the spatial approach and its interior experiences, thus generating appropriate visibility and stronger wayfinding.

Its programmatic features and exhibited themes are similar to 48 Albert’s interior programming and can be viewed as an appropriate example of how to incorporate interactive elements into the interior planning. The architectural qualities and design elements are insightful to how I will approach the adaptive re-use of the existing 48 Albert Street structure. Furthermore, how Ars Electronic Centre established a colourful atrium will be beneficial in addressing circulation in 48 Albert Street, as it allows museum visitors to have a simplified central core, easing the transitions between exhibits and adjacent spaces.
4.2 THE CURIOUS CASE OF ÇATALHÖYÜK EXHIBITION

**Project Title:** The Curious Case of Çatalhöyük, Brunei Gallery, SOAS, London.

**Project Year:** 2017-2018

**Typology:** Exhibition

**Architects:** PATTU Architecture

**Gross Area:** 1 Storey, 5500± SQ.FT.

**Project Title:** The Curious Case of Çatalhöyük.

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**DESCRIPTION:**

- The primary goal of this temporary exhibit is to provide insight into the methodology used by archaeologists within the historic Çatalhöyük excavation site. The interior environment is an interactive and engaging setting for occupants, as it guides them through the various stages and the timeline of the excavation site. Part of the exhibition is a virtual reality space that will transport the occupant into an immersive 1-to-1 recreation of the existing Çatalhöyük settlement.

- The exhibit narrates the methods of the excavation from "the initial phase of when the trowel touches the soil to the documentation of the finds, from laboratory analysis to the transfer of information." Rather than displaying found artifacts behind closed glass, they have replicated these found items through physical scans and 3d printing, enabling visitors to play and inspect these historical items in a new way.

---

*Fig. 29 - Exhibition Lobby*
ANALYSIS:

As illustrated in Figure 30, The Curious Case of Çatalhöyük features a commissioned piece by artist Refik Anadol. His media installation displays 2.8 million archived data records of roughly 250,000 reported finds on an interactive screen. The data is experienced and expressed through a machine learning algorithm that "transforms this knowledge into an immersive media installation that transcends research, archaeology, art and technology." The research of the excavation project is visually reconstructed through interactive and engaging methods to illustrate the importance of the research and individual interpretation of the findings.

DESIGN CONSIDERATIONS & RELEVANCE:

- The size and scale of the exhibition; how they invited and engaged individuals through a curated experience in such a small-scale operation. The design of the exhibition space to support multiple activities occurring at the same time.
- Their approach to the narration of their interior experience is a crucial consideration, regarding flexibility and circulation — incorporation of new technologies into their exhibition space, such as Virtual Reality and 3d printed items. Rather than displaying things behind glass to only be looked at, the exhibition provided a tactile sensory experience for the occupant. The Curious Case of Çatalhöyük offers a suitable outline for space programming, as the size and scale are comparable to the selected site.

FIGURE 30 - USER-RESPONSIVE MEDIA INSTALLATION

### 4.3 SPYSCAPE MUSEUM

**Title of the project:** Spyscape Museum  
**Location**  
928 8th Ave, New York, NY, USA  
**Typology**  
Interactive Museum  
**Project Year**  
2018  
**Architect/Design Group**  
Adjaye Associates  
**Gross Area**  
60,000 SQF

**FIGURE 31 - SPYSPACE DIGITAL EXHIBITION SPACE**  

**DESCRIPTION:**

- The Spyscape Museum in New York challenges the traditional museum and is a recent example of an interactive museum experience. The museum emphasizes the impact of espionage, modern-day data breaching and hacking in today’s society and the historical, importance and relevance of the secret services. The structure offers a 60,000 square-foot area, featuring interactive exhibitions, a rare collection of artifacts and personalized storytelling of real events.109

- Key lighting strategies are utilized throughout the exhibits and are emphasized by the use of transparencies between the museum levels. Also, as illustrated in figure 31, digital screens and metal perforations are designed to frame occupant sightlines. Another feature is the use of smoked glass partitions, as they act as barriers between exhibit spaces and as screens for its interactive projected videos.

---

ANALYSIS:

- The immersion into these spaces commences as the museum visitor first enters the structure. The programme assigns its visitors with a secret service personality and occupation, such as a cryptologist, hacker, or intelligence analyst. The museum also provides interactive exhibits and themed challenges that will educate and inform visitors. As demonstrated in figure 32, the design of the museum features key spaces, such as a surveillance mission kiosk tables and a tripwire corridor. In this space, visitors may test their ability to bypass and escape without triggering an alarm to continue through the museum.

FIGURE 32 - SPYSPACE INTERACTIVE KIOSK TABLES


DESIGN CONSIDERATIONS & RELEVANCE:

- Firstly, the design established a museum experience where visitors can create, share, and connect through themed programme events. Additionally, the museum facilitates moments of active learning, allowing the museum visitors to become more involved and invested in the museum experience.

- Secondly, the circulation of the interior is playful, enabling an organized guide for visitors through the space with the use of interactive and digital experiences, such as the tripwire hallway. Integration of video kiosks and projections are also used to enhance the interior aesthetics and material selection of the space.

- Lastly, the design of the museum actively invites visitors to become part of the museum experience, and strategically integrates their involvement with the space to dynamically influence the interior experience through their varying interactions and behaviour with the curated elements.

4.4 CAULFIELD SCHOOL:
THE LEARNING PROJECT

Title of the project: The Learning Project
Location: Melbourne, Victoria, Australia
Typology: Education Institute
Project Year: 2014
Architect/Design Group: Hayball
Gross Area: 4413 SQF

FIGURE 33 - THE LEARNING PROJECT CENTRAL HUB SPACE

DESCRIPTION:

- The Learning Project, a three-part master planning school for early learning and development, focuses on new education pedagogy which is firmly grounded in research that promotes active learning in classrooms and collaborative zones. This project was selected due to the museum’s digital learning environment on its third floor, which focuses on providing an accessible and supportive learning environment for its visitors.

- This project consisted of three test campuses that reimagined what a learning and teaching environment could consist of and how it could be implemented to support active learning. As a result, this project recognized the value of deepening how interior environments can support learning, student engagement and factors that affect student attenuation of information.111

111 Hayball. “Caulfield Grammar School

The Learning Project.” LE Solutions (2017). Retrieved from:
ANALYSIS:

The design of the school is based on the concept of four collaborative spaces that are connected by a central hub. Each space accommodates a set of diverse learning activities throughout these four interior environments: Workshop, Launching Pad, Studio, and the Hub. As illustrated in figure 34, the Hub would provide a central meeting place that would allow all students to gather for instructions collectively. Each workshop is fitted with acoustic ceiling baffles and drop-down power units to allow for flexibility and future uses.

Additionally, the workshop features adjustable height tables and seating to suit different student learning styles. This collaborative space offers a print station that acts as resource storage for both staff and student use. These interconnected physical settings established in this project provides enhanced user experience that helps promote new ways of learning. Additionally, the spaces feature breakout areas within them, where students can have access to collaborative areas for group work.

FIGURE 34 - ZONING PLAN CAULFIELD GRAMMAR SCHOOL


DESIGN CONSIDERATIONS & RELEVANCE:

- Institutional frameworks have always influenced the direction of museum education and learning. Caulfield Grammar School: The Learning Project offers a vision of how activity-based learning can support the development of the digital learning center as an environment that supports free-choice, informal, lifelong, and voluntary learning from its visitors.

- As learning is not restricted to age, the techniques and methodology used by this school are reflected in how people learn by talking and engaging with each other within the environments. The four spaces that Caulfield have programmed into their learning environment allow for a great variety of ways for learners to study, discover, interact, and have fun.

- From this example, the educational programming of the museum follows these schools’ ambition and involves optimizing learning opportunities for a diverse user group. The digital learning centre within the museum is designed to accommodate third party rentals, museum programs and makerspace events in flexible configurations, to allow for a variety of opportunities for the museum visitors to engage with the material.

FIGURE 35 - EDUCATIONAL SETTINGS – ‘WORKSHOP’

4.5 TEAMLAB SKETCH AQUARIUM EXHIBITION

Title of the project | Sketch Aquarium
Location | Tokyo, Japan
Typology | Rotational Exhibition
Project Year | 2013
Architect/Design Group | TeamLab
Gross Area | 1200± SQF

DESCRIPTION:

TeamLab’s Sketch Aquarium has seen many different theme variations, but fundamentally this exhibit allows its visitors of all ages to engage in the process of co-creation. The visitor will design, name, and scan their creation onto an animation screen that will virtually live on forever.

The exhibition fosters an environment where visitors can create and share their works with the museum digitally. Furthermore, through this process of creation, the Sketch Aquarium generates moments of interaction between individual and computer, by allowing their drawings to come to life after scanning. This exhibition allows the children to learn how creativity, computer engineering and technology can speak in harmony with one another.

FIGURE 36 - INTERACTIVE MEDIA WALL & SKETCHING SPACE

FIGURE 37 - SKETCH SCANNING & UPLOADING STATION

ANALYSIS:

- The design of the exhibition is based on generating engaging moments for creativity and power of expression from the visitor. The environment allows for multiple people to all co-create and engages with the exhibition. This precedent example illustrates the potential of utilizing interactive and animated imagery to generate a continuous collection of museum visitor and user-inputted content that can be displayed on seamless, touch-responsive LED panels.

- By allowing the visitor to be the instigator, creator and curator, this exhibition allows a unique experience to be formed between the visitors and the overall museum experience. The visitor will additionally form a memory of the experience that is unique to themselves, as the process of creation would foster a more meaningful connection to the exhibition and its message.

- From this analysis, the environment is in an illuminated space, offering areas for its visitors to play. The large spanning horizontal screen is a feature that illuminates the space, while the desks have dedicated task lighting for the sketching tables.

DESIGN CONSIDERATIONS & RELEVANCE:

- Although aimed at a younger audience, the principles used in integrating technology to generate moments of interactivity from its users will be extracted. Additionally, the use of technology and how it can be used to enhance user inputs, such as creative drawing and digital scanning to form an artificially animated artwork that will live forever with the museum.

- The importance of this example illustrates how by empowering the individual to create, they can become attached to the exhibit and can develop a personal connection with the experience. TeamLab’s Sketch Aquarium Exhibition offers a playful approach to how technology and the power of expression can support methods for co-creation and personal development in a museum environment.

- This example provided a strong understanding regarding the integration of interactive, digital kiosks in an environment for visitors to create and allow them to generate moments of becoming part of the curation process and overall museum experience.
**4.6 FUTURE CITY LAB EXHIBITION**

<table>
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<th>Future City Lab</th>
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<tbody>
<tr>
<td>Location</td>
<td>New York, New York</td>
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<td>Typology</td>
<td>Museum of the City of New York</td>
</tr>
<tr>
<td>Project Year</td>
<td>2016</td>
</tr>
<tr>
<td>Architect/Design Group</td>
<td>Joseph Group</td>
</tr>
<tr>
<td>Gross Area</td>
<td>3200± SQF</td>
</tr>
</tbody>
</table>

**DESCRIPTION:**

- Future City Lab was a part of the Museum of the City of New York's permanent exhibition, New York at Its Core, which opened in 2016. This exhibition was selected due to its careful attention to audience engagement and interaction with the exhibition's array of elements.

- The exhibition is presented through a variety of engaging exhibition techniques. These include interactive digital kiosks, sensors and screens that present the museum visitor to five key challenges and contemporary case studies that New York presently faces in the 21st century. This exhibit offers interactive tables that are feature themed games designed around, Living with Nature, Housing a Growing Population, and Urban Transportation, addressing the future challenges that New York is facing.

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115 Ibid, 62.

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**FIGURE 38 - FUTURE CITY LAB, “WHAT IF?” TABLE**


**FIGURE 39 - FUTURE CITY LAB, EXHIBITION DESIGN OUTPUT WALL**


116 Ibid, 69.
ANALYSIS:

Future City Lab serves as an open forum where New York’s local community can have a discussion, learn and be vocal about the direction they feel is correct for their community. The museum features active participant games that discuss themes of how New York citizens view “Living with Nature,” “Housing a Growing Population,” and “City Transportation.” These interactive museum exhibits allow the museum visitor a chance to draw, shift and challenge the existing challenges and opportunities that New York is presently facing.

The interactive elements are simple projections and touch-responsive interfaces that feature drag-and-drop tools and playful graphics. These tools and graphics help create an instantly engaging and stronger visible response from the museum visitor and avoid presenting dry metrics and data. Additionally, once the user has completed their scenario, the museum visitors can actively view their new creation on an animated screen, for all museum visitors to view, discuss and debate. Another element designed for the space, as illustrated in figure 38, is the “What If Table?” which prompts visitors with open questions from practitioners to generate a conversation between the museum and the museum visitor. This element is supported by a large accessible digital screen that folds along the floor, providing city and urban planning data.

DESIGN CONSIDERATIONS & RELEVANCE:

From this analysis, the materiality of the space has wood tones, use of felt and soft fabrics to welcome its visitors. The exhibit offers moments of pause and rests to allow visitors to generate potential moments of conversation between one another.

The interactive elements establish a dialogue between the museum and museum visitor to promotes active and accessible participation. Ensure all exhibit and design elements to account for accessibility, and by offering a permanent interactive exhibit, which features new and rotating case studies from the museum’s current and recent exhibitions, the museum’s visitors can become co-authors of the exhibit.

118 Ibid, 69.

4.7 PRECEDENT FINDINGS

- From these examinations into multiple educational, adaptive-reuse, and interactive exhibit precedent examples, the design considerations & their relevant findings have proven useful in demonstrating the effectiveness of how to establish a positive museum visitor experience. These precedent examples have highlighted the importance of how museums can offer engaging, fun, and hands-on experiences that establish moments of co-authorship with the museum.

- The existing materiality and selection of new materials should convey a sense of unique identity for different spaces, allowing the museum visitors to understand when they are transitioning between adjacent spaces visually. Makerspaces, Workrooms and Labs should have a dedicated space that offers specialized opportunities, where museum visitors can engage and learn during workshops. The analysis of the interactive exhibits has been helpful to the guidance of this practicum project from a design strategy perspective, regarding how people engage with user interfaces. Additionally, new technologies act as conduits to allow for increased collaboration, communication, and flexibility for the museum’s internal programming.

- Issues that have been brought up are relevant and valuable to this practicum project in providing appropriate guidance to the formulation of interactive, engaging, and informative exhibits for the museum visitor experience. Additionally, Climate control and interactive systems should be responsive to the varying loads of electrical equipment and must have appropriate environmental conditions to support them.

- The museum visitor experience can benefit from installations that provoke and challenge the interior environment, as the integrated systems react to sensor data, motion, and activity within the space. This response promotes an active learning relationship between the user and the built environment.
5.1 CLIENT PROFILE

DIGITAL LEARNING CENTRE

The Interactive Museum of Technology will act as the new home for Winnipeg’s digital enthusiasts by incorporating a Digital Learning Centre (DLC), with the purpose of bridging the gap between sharing the exhibits information and visitor engagement.

DLC is a community of builders, programmers, artists, and interactive designers, who aim at sharing knowledge and their passion for making. A makerspace is a community of like-minded individuals who have a shared interest in creating, tinkering with technology, collaborating on projects, and learn from shared knowledge. The museum will support and host weekly community events and monthly workshops for Winnipeg’s creative and analytical minds who are eager to explore technology.

The DLC group is supported with equipment, storage for parts and additional resources for supporting physical prototyping. The client additionally requires an education lab, equipped with an appropriate 3D printing station, electronics workbench, and other specialized equipment. Furthermore, the dedicated space will offer a yearly membership for use of its makerspace services and entry to the interactive museum exhibit halls. The community events and workshops focus on advanced topics in IT, programming, and affordable raspberry-pi practical computer challenges and projects.

SYSTEMS REQUIREMENTS

MECHANICAL:
- Wet Pipe Sprinklers
- HVAC
- Elevator Lift
- Individual System Controls

ELECTRICAL:
- Lighting
- Safety Detectors
- Data and Power Outlets
- Public & Private Wi-Fi System
- Individual System Controls
- Access Code and Card Readers

PLUMBING:
- Shared Restrooms
- Janitorial Room
- Water Fountains

SECURITY:
- CCTV on all four levels and inside of the elevator
- Emergency call buttons
- Security Desk and Clearance
### 5.2 STAFF PROFILES, ACTIVITIES & NEEDS:

<table>
<thead>
<tr>
<th>PRIMARY USERS:</th>
<th>DESCRIPTION</th>
<th>BEHAVIOUR NEEDS</th>
<th>PSYCHOLOGICAL NEEDS</th>
<th>SPATIAL NEEDS</th>
<th># REQ.</th>
</tr>
</thead>
</table>
| MUSEUM DIRECTOR | • Works with the entire staff to make sure the museum runs smoothly | • Computer Use  
• Organised | • + Space that promotes protecting Sensitive documents  
• + Privacy | • Non-disruptive environment  
• Breakout Room  
• +Staff lounge | 1 |
| MUSEUM DOCENT (TOUR GUIDE & MUSEUM EDUCATOR) | • Welcomes visitors to the museum  
• Plans tours and other programs for museum visitors of all ages  
• Guides and teaches visitors on tours of the museum | • Podium/Waypoint  
• Good circulation in the building  
• Sightlines | • + Private and Protected Areas from Occupants  
• + Daylighting and Artificial Lighting  
• +Non-Disruptive Lighting | • Quiet Meeting Area for visitors  
• Universal Accessibility for visitors | 1 |
| RECEPTION AND SERVICE DESK | • Sells passes to occupants and informs them of daily events | • POS System  
• Horizontal Workspace  
• Computer/Terminal  
• Accessible Counter | | • Security  
• Universal Accessibility for visitors | 1 |
| MUSEUM SECURITY GUARD | • In charge of safety for all museum objects and visitors.  
• Ensures that all museum rules are followed. | • Monitor Terminal  
• Desk/Horizontal Workspace  
• Good Sightlines of Entry | | • Security  
• Calm Environment | 1 |
5.2 STAFF PROFILES, ACTIVITIES & NEEDS:

<table>
<thead>
<tr>
<th>PRIMARY USERS:</th>
<th>DESCRIPTION</th>
<th>BEHAVIOUR NEEDS</th>
<th>PSYCHOLOGICAL NEEDS</th>
<th>SPATIAL NEEDS</th>
<th>#REQ.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURATOR, REGISTRAR AND EXHIBIT DESIGNER</td>
<td>Oversees the care of objects. Assists in the installation of the museum’s objects</td>
<td>Computer/Terminal</td>
<td>Private and Protected Areas from Occupants</td>
<td>Quiet Workspace</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Horizontal Worksurface</td>
<td>Daylighting and Artificial Lighting</td>
<td>Non-disruptive environment</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Storage</td>
<td></td>
</tr>
<tr>
<td>GRAPHIC DESIGNER</td>
<td>Assists the Public Relations Officers in creating advertisements for the museum</td>
<td>POS System</td>
<td></td>
<td>Merchandise Shelving and Display Area</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Controlled Environment for potential different hours of operations</td>
<td></td>
<td>Welcoming Atmosphere</td>
<td></td>
</tr>
<tr>
<td>PUBLIC RELATIONS OFFICERS &amp; HUMAN RESOURCES</td>
<td>Guides and teaches visitors on tours of the museum</td>
<td>Loading Bay Access</td>
<td></td>
<td>Equipment Storage</td>
<td>1</td>
</tr>
<tr>
<td>MUSEUM SHOP CASHIER</td>
<td>Runs the museum gift shop, which sells postcards and other small souvenirs</td>
<td>Horizontal Workspace</td>
<td></td>
<td>Workshop</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Controlled acoustic space</td>
<td></td>
<td>Storage for equipment and parts</td>
<td></td>
</tr>
<tr>
<td>MAINTENANCE &amp; CUSTODIAN STAFF</td>
<td>Handles maintenance of the building</td>
<td>Access to a resource room</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>MAKERSPACE MANAGER</td>
<td>Supervises and oversees the makerspace</td>
<td></td>
<td></td>
<td>Workshop</td>
<td>1</td>
</tr>
<tr>
<td>MAKERSPACE ASSISTANT TECHNICIAN</td>
<td></td>
<td></td>
<td></td>
<td>Storage for equipment and parts</td>
<td></td>
</tr>
</tbody>
</table>

STAFF TOTAL 11
### USER PROFILES, ACTIVITIES & NEEDS:

<table>
<thead>
<tr>
<th>PRIMARY USERS</th>
<th>DESCRIPTION</th>
<th>BEHAVIOUR NEEDS</th>
<th>PSYCHOLOGICAL NEEDS</th>
<th>SPATIAL NEEDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCCUPANTS / MUSEUM VISITOR (OF ALL AGES)</td>
<td>• A person who came to visit the museum and experience the exhibits.</td>
<td>• Walking,</td>
<td>• Non-Disruptive Lighting</td>
<td>• Welcoming Atmosphere</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Playing,</td>
<td>• Sightlines</td>
<td>• Well-Lit Environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Viewing,</td>
<td></td>
<td>• Security</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Interacting</td>
<td></td>
<td>• Accessibility</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Resting</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Contemplating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAKERSPACE USER</td>
<td>• A museum visitor who wants to engage and learn small coding, 3D printing &amp;</td>
<td>• Access to Computer</td>
<td>• Non-Disruptive Lighting</td>
<td>• Welcoming Atmosphere</td>
</tr>
<tr>
<td></td>
<td>programming through instructor-led workshops</td>
<td>• Collaborating</td>
<td>• Task lighting</td>
<td>• Well-Lit Environment</td>
</tr>
<tr>
<td></td>
<td>• An individual who wishes to utilize the site's available resources.</td>
<td>• Coworking space</td>
<td>• Private and Public zones</td>
<td>• Security</td>
</tr>
<tr>
<td></td>
<td>• An innovator or conceptual designer in the science and technology sector.</td>
<td>• Access to Network</td>
<td>• Sightlines</td>
<td>• Accessibility</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Access to Equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Access to Daylight</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 5.3 USER PROFILES, ACTIVITIES & NEEDS:

<table>
<thead>
<tr>
<th>SECONDARY USERS</th>
<th>DESCRIPTION</th>
<th>BEHAVIOUR NEEDS</th>
<th>PSYCHOLOGICAL NEEDS</th>
<th>SPATIAL NEEDS</th>
</tr>
</thead>
</table>
| PUBLIC RELATIONS VISITORS | • A person who will conduct interviews regarding press related matters. | • Meeting with director and core staff.  
• Secure environment | • Non-disruptive lighting  
• Sightlines | • Welcoming atmosphere  
• Well-lit environment  
• Security  
• Accessibility |

<table>
<thead>
<tr>
<th>TERTIARY USERS</th>
<th>DESCRIPTION</th>
<th>BEHAVIOUR NEEDS</th>
<th>PSYCHOLOGICAL NEEDS</th>
<th>SPATIAL NEEDS</th>
</tr>
</thead>
</table>
| DELIVERY SERVICES | • A person who meets with the curator to sign off incoming and outgoing parts for the exhibit & makerspace. | • Loading bay access  
• Feeling of security | • Non-disruptive lighting  
• Sightlines | • Well-lit environment  
• Security  
• Accessibility |

| CUSTODIAN | • Cleaning service | • Loading bay access  
• Feeling of security | |

| PUBLIC SERVICES (WASTE AND RECYCLING) | • Public services requiring routine access to on-site waste and recycling bins behind the structure. | • Easy access for loading bins | N/a |
### 5.4 SPATIAL REQUIREMENTS (M²)

#### LEVEL 01

<table>
<thead>
<tr>
<th>Area</th>
<th>Size (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated Circulation (20%)</td>
<td>125m²</td>
</tr>
<tr>
<td>Foyer &amp; Service Desk</td>
<td>55m²</td>
</tr>
<tr>
<td>Coat Room</td>
<td>6m²</td>
</tr>
<tr>
<td>Café Lounge</td>
<td>50m²</td>
</tr>
<tr>
<td>Café &amp; Catering Kitchen</td>
<td>60m²</td>
</tr>
<tr>
<td>Utility &amp; Storage Room</td>
<td>8m²</td>
</tr>
<tr>
<td>Lobby</td>
<td>35m²</td>
</tr>
<tr>
<td>Museum Giftshop &amp; Storage</td>
<td>55m²</td>
</tr>
<tr>
<td>Atrium Event Space</td>
<td>122m²</td>
</tr>
</tbody>
</table>

#### LEVEL 02

<table>
<thead>
<tr>
<th>Area</th>
<th>Size (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated Circulation (20%)</td>
<td>90m²</td>
</tr>
<tr>
<td>Exhibit Space A</td>
<td>80m²</td>
</tr>
<tr>
<td>Digital Learning Centre: Makerspace</td>
<td>70m²</td>
</tr>
<tr>
<td>Electro Room</td>
<td>8m²</td>
</tr>
<tr>
<td>Gender-Inclusive Restroom</td>
<td>30m²</td>
</tr>
<tr>
<td>Digital Learning Centre: Resource Room</td>
<td>45m²</td>
</tr>
<tr>
<td>Server Room</td>
<td>10m²</td>
</tr>
<tr>
<td>Digital Learning Centre: Manager’s Office</td>
<td>15m²</td>
</tr>
<tr>
<td>Loading Bay</td>
<td>20m²</td>
</tr>
<tr>
<td>Lobby</td>
<td>35m²</td>
</tr>
<tr>
<td>Janitorial Closet</td>
<td>6m²</td>
</tr>
</tbody>
</table>

**Total Area:** 640 / 640 m²
### 5.4 SPATIAL REQUIREMENTS (M²)

<table>
<thead>
<tr>
<th>LEVEL 03</th>
<th>LEVEL 04</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DEDICATED CIRCULATION (20%)</strong></td>
<td><strong>DEDICATED CIRCULATION (20%)</strong></td>
</tr>
<tr>
<td>90m²</td>
<td>90m²</td>
</tr>
<tr>
<td>EXHIBIT SPACE B</td>
<td>EXHIBIT SPACE D</td>
</tr>
<tr>
<td>75 m²</td>
<td>80 m²</td>
</tr>
<tr>
<td>STAIRWELLS</td>
<td>STAIRWELLS</td>
</tr>
<tr>
<td>50 m²</td>
<td>50 m²</td>
</tr>
<tr>
<td>DIGITAL SPRITE CAVE</td>
<td>ELECTRICAL ROOM</td>
</tr>
<tr>
<td>50 m²</td>
<td>8 m²</td>
</tr>
<tr>
<td>EXHIBIT SPACE C</td>
<td>GENDER-INCLUSIVE RESTROOM</td>
</tr>
<tr>
<td>80 m²</td>
<td>30 m²</td>
</tr>
<tr>
<td>LOBBY</td>
<td>Server Room</td>
</tr>
<tr>
<td>35 m²</td>
<td>10 m²</td>
</tr>
<tr>
<td>JANITORIAL CLOSET</td>
<td>LOADING BAY</td>
</tr>
<tr>
<td>6 m²</td>
<td>20 m²</td>
</tr>
<tr>
<td><strong>455 / 465 m²</strong></td>
<td><strong>465 / 465 m²</strong></td>
</tr>
</tbody>
</table>

455 / 465 m²
## 5.5 Spatial Analysis

<table>
<thead>
<tr>
<th>Adjacency Matrix</th>
<th>Service Desk</th>
<th>Coat Room</th>
<th>Café Lounge</th>
<th>Catering Kitchen</th>
<th>Utility &amp; Storage</th>
<th>Level 01 Lobby</th>
<th>Atrium Space</th>
<th>Stairwell</th>
<th>Corridor</th>
<th>Gender-Inclusive Restroom</th>
<th>Museum Giftshop</th>
<th>Loading Bay</th>
<th>Janitorial Closet</th>
<th>Electrical Room</th>
<th>Server Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SERVICE DESK</td>
<td></td>
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<tr>
<td>2</td>
<td>COAT ROOM</td>
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<tr>
<td>3</td>
<td>CAFÉ &amp; LOUNGE</td>
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<tr>
<td>4</td>
<td>CATERING KITCHEN</td>
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<td>5</td>
<td>UTILITY &amp; STORAGE ROOM</td>
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<tr>
<td>6</td>
<td>LEVEL 01 LOBBY</td>
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<tr>
<td>7</td>
<td>ATRIUM EVENT SPACE</td>
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<tr>
<td>8</td>
<td>STAIRWELLS</td>
<td></td>
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<tr>
<td>9</td>
<td>CORRIDORS</td>
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<tr>
<td>10</td>
<td>GENDER-INCLUSIVE RESTROOM</td>
<td></td>
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</tr>
<tr>
<td>11</td>
<td>MUSEUM GIFTSHOP &amp; STORAGE</td>
<td></td>
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</tr>
<tr>
<td>12</td>
<td>LOADING BAY</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>13</td>
<td>JANITORIAL CLOSET</td>
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<tr>
<td>14</td>
<td>ELECTRICAL ROOM</td>
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<tr>
<td>15</td>
<td>SERVER ROOM</td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>
# 5.5 Spatial Analysis

## Adjacency Matrix

<table>
<thead>
<tr>
<th></th>
<th>Stairwell</th>
<th>Level 02 Lobby</th>
<th>DLC Makerspace</th>
<th>DLC Resource Room</th>
<th>DLC Manager's Office</th>
<th>Exhibition Space - A</th>
<th>Corridor</th>
<th>Gender-Inclusive Restroom</th>
<th>Loading Bay</th>
<th>Janitorial Closet</th>
<th>Electrical Room</th>
<th>Server Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>STAIRWELLS</td>
<td>✅</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>LEVEL 02 LOBBY</td>
<td></td>
<td>✅</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>DLC MAKERSPACE</td>
<td></td>
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<td>✅</td>
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<td></td>
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**Matrices Legend:**
- **Primary Adjacency** (Green)
- **Secondary Adjacency** (Blue)
## 5.5 Spatial Analysis

### Adjacency Matrix: Level 03

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<th>Stairwells</th>
<th>Level 03 Lobby</th>
<th>Exhibition Space – B</th>
<th>Digital Sprite Cave</th>
<th>Exhibition Space – C</th>
<th>Corridors</th>
<th>Gender-Inclusive Restroom</th>
<th>Loading Bay</th>
<th>Janitorial Closet</th>
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### 5.5 SPATIAL ANALYSIS

#### ADJACENCY MATRIX LEVEL 04

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<th>Stairwells</th>
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<th>Quiet Room</th>
<th>Meeting Room</th>
<th>Shared Equipment Space</th>
<th>Curation Office</th>
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**Matrices Legend:**
- **Primary Adjacency**
- **Secondary Adjacency**

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90
## 5.6 AESTHETIC & MATERIAL CONSIDERATIONS

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>CONCEPT &amp; ATMOSPHERE</th>
<th>LIGHT &amp; COLOUR</th>
<th>MATERIALS, APPLICATION &amp; MAINTENANCE</th>
</tr>
</thead>
</table>
| 01    | INCL. SECURITY MEASURES TO ENSURE MUSEUM SAFETY AND ACCESS IS APPROPRIATE TO PUBLIC.  
       | VISILE SECURITY.        | COLOUR APPLICATIONS TO BE USED AS A COMMUNICATIVE DEVICE TO INDICATE THE DIFFERENT EXHIBITION SPACES.  
       | WELCOMING ATMOSPHERE.   | NEUTRAL & WOOD TONES TO BALANCE TECHNOLOGIC AND METALS INCORPORATED IN THE SPACES  
       | STRONG INTEGRATION OF INTERACTIVE DESIGN ELEMENTS & EXHIBITS THAT ENHANCE THE VISUAL CONNECTION TO CENTRAL ATRIUM.  
       | COLOUR APPLICATION AS WAYFINDING DEVICE.  | CENTRAL ATRIUM TO ALLOW DAYLIGHT TO PENETRATE ALL LEVELS  
       |                                                    | ADDITION OF PLAYFUL COLOURS TO INCORPORATE FUN AND ENGAGEMENT FOR USERS  
| 02    | INCORPORATE DESIGN ELEMENT THAT VISUALLY CONNECTS THE SECOND LEVEL TO OTHER LEVELS.  
       | STRONG INTEGRATION OF INTERACTIVE DESIGN ELEMENTS.  
       | EXHIBITS THAT ENHANCE THE VISUAL CONNECTION TO THE CENTRAL ATRIUM.  
       | COLOUR APPLICATION AS WAYFINDING DEVICE  | COLOUR APPLICATIONS TO BE USED AS A COMMUNICATIVE DEVICE TO INDICATE THE DIFFERENT EXHIBITION SPACES.  
       |                                                    | NEUTRAL & WOOD TONES TO BALANCE TECHNOLOGIC AND METALS INCORPORATED IN THE SPACES  
       |                                                    | CENTRAL ATRIUM TO ALLOW DAYLIGHT TO PENETRATE ALL LEVELS  
       |                                                    | ADDITION OF PLAYFUL COLOURS TO INCORPORATE FUN AND ENGAGEMENT FOR USERS  
       |                                                    | SOUND ABSORPTION BAFLES WHERE NECESSARY  
       |                                                    | LOW EMITTING VOC MATERIAL & PAINT SELECTION  
       |                                                    | DURABLE & EASY TO MAINTAIN MATERIALS  |
## 5.6 AESTHETIC & MATERIAL CONSIDERATIONS

<table>
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<tr>
<th>LEVEL</th>
<th>CONCEPT &amp; ATMOSPHERE</th>
<th>LIGHT &amp; COLOUR</th>
<th>MATERIALS, APPLICATION &amp; MAINTENANCE</th>
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<tr>
<td>03</td>
<td><strong>INCORPORATE DESIGN ELEMENT THAT VISUALLY CONNECTS THE THIRD LEVEL TO OTHER LEVELS.</strong>&lt;br&gt;<strong>VISUALLY CREATE SPACES THAT OFFER A WELCOMING ATMOSPHERE UPON FIRST IMPRESSION.</strong>&lt;br&gt;<strong>FUN, ENGAGED LEARNING ENVIRONMENT</strong>&lt;br&gt;<strong>COLOUR APPLICATION AS WAYFINDING DEVICE.</strong></td>
<td><strong>COLOUR APPLICATIONS TO BE USED AS A COMMUNICATIVE DEVICE TO INDICATE THE DIFFERENT EXHIBITION SPACES.</strong>&lt;br&gt;<strong>OPTIMIZE VIEWS TO THE OUTSIDE, TO ALLOW FOR NATURAL LIGHTING.</strong>&lt;br&gt;<strong>VIEW TO THE CENTRAL ATRIUM</strong>&lt;br&gt;<strong>ADDITION OF PLAYFUL COLOURS TO INCORPORATE FUN AND ENGAGEMENT FOR USERS</strong></td>
<td><strong>SOUND ABSORPTION BAFFLES WHERE NECESSARY</strong>&lt;br&gt;<strong>LOW EMITTING VOC MATERIAL &amp; PAINT SELECTION</strong>&lt;br&gt;<strong>DURABLE &amp; EASY TO MAINTAIN MATERIALS</strong></td>
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<tr>
<td>04</td>
<td><strong>INCORPORATE DESIGN ELEMENT THAT VISUALLY CONNECTS THE FOURTH LEVEL TO OTHER LEVELS.</strong>&lt;br&gt;<strong>BALANCE BETWEEN PUBLIC AND PRIVATE AREAS, WHILE MAINTAINING AN ATMOSPHERE THAT RESPECTS THE ADJACENT EXHIBITION THAT IS LOCATED ON THIS FLOOR.</strong>&lt;br&gt;<strong>COLOUR APPLICATION AS WAYFINDING DEVICE.</strong></td>
<td><strong>COLOUR APPLICATIONS TO BE USED AS A COMMUNICATIVE DEVICE TO INDICATE THE DIFFERENT EXHIBITION SPACES.</strong>&lt;br&gt;<strong>SPACE TO OFFER VIEWS TO THE OUTSIDE AND OPTIMIZE NATURAL LIGHTING.</strong></td>
<td><strong>SOUND ABSORPTION BAFFLES WHERE NECESSARY</strong>&lt;br&gt;<strong>LOW EMITTING VOC MATERIAL &amp; PAINT SELECTION</strong>&lt;br&gt;<strong>DURABLE &amp; EASY TO MAINTAIN MATERIALS</strong>&lt;br&gt;<strong>WORKSTATION DOCK ABILITY, TO ALLOW STAFF TO SIT AND WORK ON THEIR LAPTOPS AT ANY STATION.</strong></td>
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CH6.0 ___________ DESIGN DEVELOPMENT
6.1 INTRODUCTION TO DESIGN DEVELOPMENT

INTRODUCTION:

The design presented in this section is a culmination of the literary research and design precedent analysis on educational and interactive environments within a learning setting, as it relates specifically to knowledge transfer and constructivist learning principles. The following chapter outlines the proposed design solution for this adaptive reuse structure, by exploring the conceptual development, design language, the spatial organization, the internal interactive exhibitions, and key design features throughout the interior environment. Additionally, this section will incorporate annotated floor plans with design strategies developed from the analytical framework that helps illustrate how the spaces can encourage and nurture the museum visitor to create moments of forum, active learning, and engagement.

CONCEPT:

Conceptual exploration for this interactive museum took inspiration from the idea of fungi synergy. Synergy was selected as the theme to connect the interactive museum’s underlying goals and the project’s design language by establishing a link between the structure’s adaptive reuse elements and the site’s new internal programming. The internal programming of the museum embodies the concept of synergy, through the form of knowledge transfer between the museum visitor and the museum’s messages, a sense of place for community, informal interaction between people and the museum’s messages and furthermore a collaborative environment for the museum visitor.
ANALYSIS:

Synergy is broadly defined as the combined effects of two or more organisms to produce a greater result than each would achieve individually. The conceptual exploration for this interactive museum took inspiration from the idea of synergy found in nature. Fungi are stationary organisms; however, its mycelium network underground grows outwards as strands to look for nutrients to support itself and grow.

Studying the process of mushroom mycelium networks, spores and the growth of fungi through synergism, predominant gestures of rebirth and networking presented a strong visual language through which to express concepts of knowledge sharing and helped inform an interior environment that can adapt to change. The properties of fungi, and their ability for vertical and subterranean growth, have been examined due to their capability to create internal networks and branches with one another. These characteristics of mycelium and their ability to generate infinite possibilities of gesture, movement, and forms has been deconstructed to establish a base triangular language for this design.

6.2 CONCEPTUAL DEVELOPMENT

APPLICATION:

As represented by the relationship of the mushroom and insect; Synergy, as found in nature, is defined as a combined effect of two or more organisms that produce a greater result than each would achieve individually. This reflects the relationship between the museum and its habitual audience. Additionally, the internal programming of the museum embodies synergy through the form of the following:

1) The pathways will enable the museum visitor to have moments of reflection, allowing them to pause and create informal moments of interaction between the other visitors and the museum’s messages.

2) Establish a sense of place to foster a community by designing the digital learning centre to support moments for engagement and dialogue between visitors. These nodes will be primarily represented by the main floor’s café, atrium event space and the second floor’s makerspace. Additionally, this will allow for a collaborative environment for the museum visitor, where they will be able to explore, engage and then converse.

3) The museum will act as a network to support the museum visitor’s ability to learn and establish individual growth by providing multiple points of knowledge transfer throughout the museum’s interior and exhibition spaces. The museum’s design will mimic this network web, by allowing for multiple ways to engage and explore the interior environments.

FIGURE 43 – FORM DECONSTRUCTION
6.3 MUSEUM BRANDING

LOGO:

dlc

INTERACTIVE MUSEUM OF TECHNOLOGY +
DIGITAL LEARNING CENTRE

MISSION STATEMENT:

Our mission at Digital Learning Centre is creating unique educational and immersive experiences that foster imagination, creativity, and active learning.

APPLICATION:

The conceptual form and visual identity were developed by dissecting the visual characteristics and qualities of the structure. As reflected in figure 45, the primary colour palette selected to represent DLC is the deep red, reflective of the structure’s metal roofing. The integration of colour is implemented in the museum’s wayfinding and allows the brand to identify as lively, friendly, and playful.

FIGURE 44 – CONCEPTUAL FORM APPLICATION
FIGURE 45 – MUSEUM BRANDING APPLICATION EXAMPLES
FIGURE 46 – CONCEPTUAL FORM DEVELOPMENT AND APPLICATION IN EXHIBIT DESIGN
FIGURE 47 – MUSEUM FRONT ENTRANCE PERSPECTIVE
INTRODUCTION:

Digital technologies and interactive elements provide a valuable and engaging experience for the museum visitor. The following spatial exploration utilizes touchscreens, digital displays, and computer-driven interactive systems, as they support the museum’s narrative messages and help reinforce the learning objectives set out from the theoretical framework.

Many museum visitors would have entered the museum with a personal mobile phone. These personal mobile devices can scan a QR code available at each exhibition to further their engagement beyond the museum walls and help the museum visitor remain connected to the museum’s message and learning objectives.

This section informs how these digital experiences are incorporated into the museum visitor experience and additionally indicates their location. Following the design language, the spatial organization of the interactive museum and digital learning centre has been zoned primarily according to the programmatic needs regarding public, private and accessible museum visitor experience.

INTERACTIVE CATEGORIES:

Through the interactive experiences and programming of the exhibitions available within the Interactive Museum of Technology and Digital Learning Centre, visitors can experience a wide range of systems and digital devices that can be categorized by the following types:

<table>
<thead>
<tr>
<th>TYPE:</th>
<th>SUBCATEGORY:</th>
</tr>
</thead>
<tbody>
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<td>1 SIMULATION &amp; MODELS</td>
<td>-Digital Cave Environment</td>
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<tr>
<td></td>
<td>-Digital Gallery</td>
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<td>2 GAMES</td>
<td>-Case Studies</td>
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<td>-Scenario</td>
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<td>-Creation</td>
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<td>3 MULTIMEDIA</td>
<td>-Sound (Audio)</td>
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<td>-Graphics (Visual)</td>
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<td>-Mobile (Cellphones)</td>
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<td>-Kiosks</td>
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<td>4 PRESENTATION</td>
<td>-Video Projection</td>
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<td>-Theatre Style</td>
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<td>-Immersive Digital Display</td>
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<td>5 VISUALIZATION TOOLS</td>
<td>-Virtual Reality</td>
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<td></td>
<td>-Artificial Reality</td>
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7.1 LEVEL ORGANIZATION

LEVEL 04 /
- MUSEUM OFFICE
- CURATION OFFICE
- EXHIBITION SPACE: D

LEVEL 03 /
- EXHIBITION SPACE: C
- EXHIBITION SPACE: B

LEVEL 02 /
- EXHIBITION A
- DLC: MAKERSPACE
- DLC: RESOURCE ROOM

LEVEL 01 /
- SERVICE DESK
- CAFÉ LOUNGE
- CAFÉ CATERING KITCHEN
- ATRIUM & ROTATIONAL SPACE
- MUSEUM GIFTSHOP
- GENDER-INCLUSIVE WASHROOM*
- LOADING BAY*
- SERVER ROOM*
- UTILITY ROOM*
- ELECTRICAL ROOM*
- STAIRWELL*

*stacked
7.2 LEVEL 01 FLOOR PLAN

FIGURE 50 – LEVEL 01 ZONING DIAGRAM
FIGURE 51 – LEVEL 01 AXONOMETRIC SECTION
FOYER, SERVICE DESK & MAIN LOBBY

DESCRIPTION:
The main entrance sets the stage for transforming new guests into a museum visitor. The entrance communicates a solemn atmosphere that invites visitors towards the service desk. The foyer communicates a practical purpose, one that is set up to provide information to the museum visitor and sell tickets. The environment also introduces subtle elements along the north foyer wall, welcoming guests to engage actively and play by participating with an interactive display.

The service desk provides a broad range of information material and a digital kiosk that offers guests quick answers to the most asked questions. Additionally, the desk facilitates a more targeted and personalized service for the museum visitor by being orientated towards the central atrium and elevator lobby, allowing staff and security to monitor and assist visitors.

The adjacent café lounge acts as an extension to the touchdown seating, located adjacent to the foyer, acts as space for museum guests to wait and reconnect with their family, friends, or group. Additionally, this space acts as a space where museum visitors gather for timed group tours.

KEY FEATURES:
- Information Kiosk
- Interactive Display
- Service Desk
- Security Desk
- Point of Service Systems
- Waiting Area

LOCATION:

Scale: NTS
FIGURE 52 – LEVEL 01 DLC MUSEUM INFORMATION DESK PERSPECTIVE

DIGITAL LEARNING CENTRE GIFT SHOP

LEVEL 01

DESCRIPTION:
The location of the gift shop is in relation to the standard route of exit of the museum. The location of the gift shop allows for a possible service stop on their way in and out. The environment is open to the public and does not require an entrance fee to view or access the space.

The reasoning for this gift shop and its location is based upon the research of John Falk and Lynn Dierking. By providing additional supportive engagements such as a gift shop, which offer services and objects that go beyond the exhibition, museum shops are a catalyst in creating a habitual museum visitor.121

By allowing the museum visitor the opportunity to purchase memorabilia, the object that they purchase signifies their past presence at the museum and gives the purchased object a context that is structured for installing memories.122

KEY FEATURES:
- Floor Display Shelving
- Wall-mounted Shelving
- Point of Service System & Counter
- Display Window
- Full Body Scanner Room & 3D Printer
- Storage Room

LOCATION:

Scale: NTS

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FIGURE 53 – LEVEL 01 INTERIOR ELEVATION – MUSEUM GIFTSHOP SOUTH VIEW

FIGURE 54 – LEVEL 01 INTERIOR ELEVATION – MUSEUM GIFTSHOP DISPLAY WINDOW SOUTH VIEW
ATRIUM & EXHIBIT SPACE

DESCRIPTION:
This exhibition is a rotational display and event space located in the central atrium. The event space supports and offers group seating of 42+ people. This rotational exhibit space is equipped with suspended projection screens along the southern interior glazing. The adaptive reuse of the existing north wall highlights the existing cladding and exposed brick. These elements influenced the allocation of seating and presentation space due to the sound absorption of the materials.

The event space is equipped with adjacent storage space for folded round tables and stacked chairs. The atrium ceiling is pitched and flows towards the existing exposed north brick wall, allowing for rain drainage to flow away from the structure.

Additionally, the central atrium allows for views in and out of the space, allowing for visitors to always be connected visually, while visitors explore the museum and its upper exhibits.

KEY FEATURES:
- Event Space
- Rotational Exhibition Space
- Overhead Skylight Glazing
- Presentation Space
- Seating for 42+ Adaptive Reuse Elements

LOCATION:
FIGURE 55 – LEVEL 01 EVENT SPACE / ATRIUM PERSPECTIVE
FIGURE 56 – LEVEL 01 LOBBY WEST PERSPECTIVE
FIGURE 57 – CENTRAL STAIRCASE – TYPICAL LEVEL INDICATION GRAPHIC PERSPECTIVE

7.3 LEVEL 02 FLOOR PLAN

FIGURE 58 – LEVEL 02 ZONING DIAGRAM
IMAGE GENERATED BY AUTHOR. LEVEL 02 ZONING DIAGRAM. 2020. VISUAL IMAGE.
FIGURE 59 – LEVEL 02 AXONOMETRIC SECTION
FIGURE 60 – LEVEL 02 LOBBY SOUTH PERSPECTIVE
FIGURE 61 – LEVEL 02 LOBBY NORTH PERSPECTIVE
Image generated by Author. Level 02 Lobby North Perspective. 2020. Visual Image
DIGITAL LEARNING CENTRE: MAKERSPACE

DESCRIPTION:
The makerspace is designed to complement the museum’s constructivist approach to learning, by offering a forum for its users to discuss, test ideas and create openly.

The makerspace provides a welcoming, hands-on learning environment offering a collaborative workspace environment for making, learning, exploring, and sharing knowledge surrounding topics regarding technology, electronics, 3d printing, 3d modelling, coding, and robotics.

Additionally, this space offers workshops and lecture run events that discuss computers, machining, technology, science, digital art, allowing individuals to gather and openly collaborate. The environment creates a resourceful learning environment and modernizes the teaching and learning to create hands-on and engaging lessons for the museum visitors and workshop attendants.

KEY FEATURES:
- Open Workspace
- Collaborative environment
- 3D Printing Stations
- Mobile Furniture
- Display Area
- Storage & Lockers
- Presentation Space
- Overhead Projector.
- Whiteboard & Tack boards

LOCATION:
Scale: NTS
FIGURE 62 – LEVEL 02 DLC MAKERSPACE PERSPECTIVE
**DIGITAL LEARNING CENTRE: RESOURCE ROOM**

### DESCRIPTION:

The resource room is an available resource for museum visitors to actively investigate, play and learn about the workshops available within the museum. Furthermore, the education lab additionally acts as a breakout space for larger workshop groups, enabling multi-purpose learning within the makerspace. The resource room is open to supervised users, membership holders, and workshop guests.

Additionally, the space is a hands-on, instructor-led learning environment that has been created by incorporating interactive mediums and offers readily available access to equipment, such as 3D printers and laser cutters.

The adjacent digital learning centre manager’s office overlooks the space to ensure that safety measures and questions are being tended to.

### KEY FEATURES:

- Open Workspace
- Resource Hub
- Readily available equipment
- Storage Space
- Ceiling Mounted Robotic Arm
- Worktables
- Material Cart

### LOCATION:

![Floor Plan](image)

Scale: NTS
FIGURE 63 – LEVEL 02 INTERIOR ELEVATION – DIGITAL LEARNING CENTRE MAKERSPACE – SOUTH WALL

FIGURE 64 – LEVEL 02 INTERIOR ELEVATION – DIGITAL LEARNING CENTRE RESOURCE ROOM – SOUTH WALL
EXHIBIT A: HELLO WORLD – THE IMPACTS OF CODING

LEARNING OBJECTIVE:
Firstly, the exhibit introduces several different digital coding languages to the museum visitor for them to understand the who developed and promoted the language, what the language has affected, where in the world it originated and why it developed.

Freestanding Kiosks are also available in the exhibition space, allowing more than one museum visitor to engage with the information available. The exhibition is presented across multiple immersive digital monitors that respond to the user’s touch. This active participation with the exhibit offers visitors moments of play and can potentially entice them to discover more by actively responding to their gestures.

The exhibit also features a postcard & bookmark souvenir display, offering museum visitors to pick up, explore and keep significant figures within the tech industry.

KEY FEATURES:
- Immersive Digital Touch-Display,
- Multimedia, Graphics,
- Sound Enabled Interactive Kiosks
- Souvenir Postcard Display
- Seating Area
- If/Then Puzzle Wall

LOCATION:
7.4 LEVEL 03 FLOOR PLAN

FIGURE 66 – LEVEL 03 ZONING DIAGRAM
IMAGE GENERATED BY AUTHOR. LEVEL 03 ZONING DIAGRAM. 2020. VISUAL IMAGE.
FIGURE 67 – LEVEL 03 AXONOMETRIC
Image generated by Author, Level
LEARNING OBJECTIVE:
This exhibit follows and expands upon the precedent example, Sketch Aquarium. The museum visitor will physically draw, scan, and view their sketch or scanned sprite. This experience will be furthered by incorporating the learn to code program and interface called Scratch. Unlike Java and Python, where you must type in coding by hand, in Scratch, there are easy interactive, drag and drop, block blueprints that act as commands - that you would normally have to type.

A sprite can be any drawn object. Once drawn, the sprite will then be filtered by staff to be scanned and loaded into the digital cave environment that is fully interactive and features tactile response.

INTERACTIVE ELEMENTS:
These blueprint blocks will allow the user to generate what their sprite likes - such as colours, keywords, types of food, places etc. These keywords act as "Flags" - so when their sprite does an action - such as: talking to another sprite they have a chance of becoming friends.

These blueprints will allow the sprite to have a conversation between other another sprite and allows the other sprites to interact with other sprites. The exhibit is outfitted with an LED floor that is equipped with Kinect technology to detect movement from the museum visitors.

FEATURES:
The scene will feature touch screens and interactive sensors - Once complete and scanned, the user and other users can interact with their sprites. Based on sensors and touch screen capabilities, the sprites will be able to detect when users interact with them. Allowing sprites to react and respond to user interactions.

This user-created content and sprites is a permanent exhibition and will continually grow based on the number of newly scanned creations.

LOCATION:

---

FIGURE 69 – LEVEL 03 - EXHIBIT B: AUGMENTED REALITY & SPRITE CREATION STATIONS PERSPECTIVE
FIGURE 70 – LEVEL 03 - EXHIBIT B: DIGITAL SPRITE CAVE PERSPECTIVE

Image generated by Author. Level 03 - Exhibit B: Digital Sprite Cave Perspective. 2020. Visual Image
EXHIBIT 4: STROKE OF GENIUS – AI ART LAB

LEARNING OBJECTIVE:
This exhibit emphasizes the potential of artificial intelligence and offers individuals of all ages to become master painters.

Nvidia’s artificial intelligence tool frames the power and potential of ai in the field of art, architecture, and urban planners. The museum visitor will be actively engaged, have fun creating and learn how the AI tool establishes its algorithm to generate these masterpieces.

With the press of a button, using simple colour outlines and strokes allows the museum visitor to generate a work of art that they can email and or print out and frame in the gift shop — allowing their artwork to become sentimental.

FEATURES:
This exhibit utilizes kiosks equipped with Nvidia’s generative adversarial network (GAN) AI model. This software gives users what Nvidia is calling a smart paintbrush, allowing users to create fundamental outlines of a scene and have the artificial intelligence transform these rough sketches into convincing, realistic results. Once completed, the artwork generated from the users will be digitally uploaded and displayed on rotation within the exhibition.

ELEMENTS:
- Large Immersive Digital Touch-Display,
- Multimedia,
- Graphics,
- Digital Media Screen
- Interactive Kiosks

LOCATION:

FIGURE 71 – LEVEL 03 - EXHIBIT C: STROKE OF GENIUS ENTRANCE PERSPECTIVE

FIGURE 72 – LEVEL 03 - EXHIBIT C: STROKE OF GENIUS PERSPECTIVE

7.5 LEVEL 04 FLOOR PLAN

FIGURE 73 – LEVEL 04 ZONING DIAGRAM
FIGURE 74 – LEVEL 04 AXONOMETRIC
EXHIBIT 5: BLOCK BY BLOCK - OUR DATA IN MOTION

LEARNING OBJECTIVE:
This exhibit opens the floor to the museum visitor to discuss their opinion on the socio-cultural implications of this technology for the security of our online data. In doing so, the exhibit presents our data as a social reality, rather than science fiction.

The exhibit is an open dialogue experience, where visitors can explore and learn about the hidden realities of how important personal data and online security is across the globe and how open and readily available our online information is.

Interactive tables are installed, enforcing proper circulation pathing around the exhibit. Additionally, these tables allow the museum visitor to swipe through a timeline and view specific global territories, searches and keywords that were popular across the globe during certain times.

The multi-media illustrates an interactive movie, offering the museum visitor a new lens on online data and aims at enabling people to understand how data, information and metadata are presently being used, sold, and exploited.

Lastly, a physical interactive display is featured at the far end of the exhibit space, allowing visitors to understand the process of securely sending and receiving data through the internet.

KEY FEATURES:
• Immersive Digital Touch-Displays,
• Multimedia, Graphics & Sound
• Interactive Media Tables
• Seating Area
• Physical Representation Display
• Interactive Film

LOCATION:
Scale: NTS
FIGURE 75 – LEVEL 04 - EXHIBIT D: OUR DATA IN MOTION ENTRANCE PERSPECTIVE

FIGURE 76 – LEVEL 04 - EXHIBIT D: OUR DATA IN MOTION PERSPECTIVE

7.6 DESIGNING FOR THE HABITUAL MUSEUM VISITOR

- The total design of this Digital Learning Centre has focused on how to create a positive learning experience for all its museum visitors, enabling learners who come from different levels of knowledge to equally engage with the exhibited dialogues and be able to absorb the interior environment’s rich, resonant and interactive experiences. Although museums offer large amounts of information that they wish to share, the design of the Digital Learning Centre has strategically framed the application of a multitude of interactive elements within its exhibits and educational environments to encourage the museum visitor to explore the interior and further be invited into the exhibited space.

- Moreover, the museum’s interior design has concentrated on creating a meaningful, interactive, and shared experience for the museum visitor. The curation and implementation of the digital interfaces in the Digital Learning Centre’s exhibition spaces has been explored through a virtual environment to help assist in investigating the significant role of the museum visitor. These studies framed the importance of designing with the human senses in mind and helped develop appropriate interactive design choices for the museum visitor experience.

- The utilization of Virtual Reality (VR) as a design tool during the conceptual phase of this museum has provided new perspectives, generated quick feedback and insight regarding design implementation and scale relations of interior elements. The implementation of interactive design and placement of digital interfaces in an educational environment has been explored and tested with the use of virtual reality studies, as presented later in this document. These studies acted as a framework to successfully test the atmosphere, scale, materiality, and interactive design methods to better accommodate and facilitate an accessible and educational environment.
8.1 INTRODUCTION TO VIRTUAL REALITY STUDIES

INTRODUCTION:

- Due to the recent global event, covid-19 has impacted the initial intent of the virtual reality studies for this project. The original purpose of using virtual reality to design this museum was to determine sensibilities surrounding interaction, video, and virtual experiences.

- The primary space that was to benefit from this exploration was the augmented reality and virtual reality exhibit on level three. Initially it was to be a dedicated space that required individuals to be equipped with wireless VR equipment, enabling the museum visitor to have a curated experience with the other VR equipped visitors. The predicaments surrounding our current understanding of how covid-19 is transferred between surface, person and other means of contact has resulted in the evolution of these studies to provide and focus on visitor safety & experience.

- From these virtual reality studies, which have taken place throughout the design process, have helped establish a new sensibility towards the materiality, scale and spatial awareness when designing the interior environment. Having this tool readily available for a designer, to quickly enter and inspect design changes, has enabled a new method to test and challenge an interior environment.

FIGURE 77 – VIRTUAL REALITY STUDIES EXPLORATION
APPLICATION:

- From this analysis and related studies, it is clear that technology plays a massive part in the modern museum experience. To complement this aspect, Virtual Reality (VR) was implemented in the design phase to generate a different perspective – one of total immersion while designing the interior spaces and interactive experiences.

- Virtual reality has allowed this interactive museum to have a sense of reality. The ability to walk, look around and interact with elements of design has offered a new perspective to the implementation of hands-on, engaging and constructivist learning environments, by virtually testing those experiences firsthand. The following section delves into these aspects: scale relationship, volume, atmosphere, interactive elements, design, sense of place and experience.

PROCESS:

- The workflow followed from first exporting the established Autodesk Revit file into Unreal Engine’s Twinmotion rendering program. This allowed for full exploration of the BIM file and quickly apply appropriate materials and adjustments.

![PROJECT 3D VISUALIZATION PIPELINE](image-generated-by-author-project-3d-visualization-pipeline-2020-visual-image)
8.2 VR STUDIES FINDINGS

- The ability to create a three-dimensional virtual experience has assisted designing for spaces with appropriate lighting, when dealing with digital interfaces that can and will influence a space’s ambient lighting. While working within the Twinmotion, the ability to simulate reflection and glow from digital screens and interfaces has created a stronger method for creating a well-lit environment.

- While exploring the design of the museum in virtual reality, from the software’s real-time rendering of lighting and animated screens, it became apparent that materials were being affected by screen flickering and the blue tint of the digital interfaces. This supported the use of dull, saturated colours within the exhibition spaces, and create a visual juxtaposition between the more public areas of the museum. By viewing and testing the exhibition spaces during the design process has enabled a stronger sense for materiality, accessibility, atmosphere, and an overall refined final design.

- Utilizing virtual reality as a design tool was used during all stages of design and proved most useful during the mid-level involvement. This was due to the countless possibilities during the earlier stages, by offering too many possibilities. Due to this, virtual reality proved more effective as a way to modify and test design decisions, rather than creating and designing within virtual reality. As the software does not allow design changes while experiencing virtual reality beyond adjusting the time of day, object’s materials, and the placement of pre-modelled objects, virtual reality had proven most advantageous during mid-stage testing of different analog designs exported and formed from Autodesk Revit. As illustrated in figure 77 and 79, these virtual reality studies have influenced the design of the interfaces themselves, the renditions of the digital tables that are located in the exhibition spaces had been revised, as once viewed at a new perspective revealed accessibility issues with its prior design.

FIGURE 79 – VIRTUAL REALITY STUDIES EXPLORATION
From these virtual reality studies, the role of Virtual Reality (VR), along with Augmented Reality (AR) and other mixed reality experiences, for interior design and exhibit design have greatly impacted the design process and interior environment. By exploring through the journey of the museum visitor, the additional design dimension helps test and confirm a designer’s ideas of a space.

Although virtual reality is an ever-evolving design tool, the hardware and software seem to be continually developing into a more sophisticated device, allowing interior designer’s greater quality and realism to their environmental designs.

**FIGURE 80 – PRE VR-STUDIES**

**FIGURE 81 – POST VR-STUDIES**
RESPONDING TO QUESTIONS OF INQUIRY

There are major changes that museums need to respond to, creating new challenges and design needs to evolve to be responsive to these digital and technologic pressures. The following reflective discussion centers on how the work completed within this practicum project has answered the three primary questions of inquiry present in chapter 1.3.

1. HOW ARE MUSEUMS CURRENTLY BEING TRANSFORMED INTO PUBLIC GATHERING SPACES, AND HOW CAN THEIR INTERIORS FORM NEW CONNECTIONS WITH ITS OCCUPANTS THROUGH DIGITAL MEDIA AND DEVELOPING TECHNOLOGIES?

Museums are attempting to attract audiences daily. From this analysis, while the degree may differ, there is a stigma surrounding museums as one-time experiences. This generates a negative view on their role within society. To attract masses to their site’s, museum curation has begun to see the value of implementing new technologies into their exhibits. In all disciplines, digital media and developing technologies, such as Augmented Reality (AR) and Virtual Reality (VR), are becoming influential in the approach to training, certification and entertainment and integrating immersive technologies in an environment offers a new perceptive of engagement for active learners who prefer a hands-on approach.

This interactive museum and digital learning centre offer Winnipeg’s exchange district a next-generation model of teaching and learning that focuses on hands-on, immersive, and play-oriented experiences. These series of dedicated exhibition spaces create moments for the museum visitor to become actively engaged in science, technology, engineering, and coding. The digital learning centre’s virtual reality media room provides a new interior space, one that can connect within and beyond the typical classroom, allowing virtual learning environment that crosses institutions, cities, and communities. These experiences help exposes active learners to a wider range of voices and opinions, generating moments of curiosity and discussion.
2. **HOW CAN INTERACTIVE DESIGN HELP FACILITATE THE NEED FOR A PLACE OF FORUM FOR THE MUSEUM’S VISITORS AND OCCUPANTS?**

- The human experience offers new possibilities for the future of design. Specifically, from this research, interactive design creates moments of engagement. This means that the museum visitor is offering themselves upon the experience. They are attempting to connect to the interior environment by generating a social dialogue between the curated experience and their ideals.

- This potential response is varied but may bloom into the individual having a stronger feeling towards the subject matter, an object that was displayed or experiences that were explored. Furthermore, this sensation is how interactive design can help facilitate the need for a place of a forum for the museum’s visitors, by generating a want and desire for communities that share similar likes and dislikes. Museums can become this facility. Enabling a habitual museum experience and offering support for its relative communities.

3. **WHAT DESIGN STRATEGIES COULD BE EMPLOYED TO ENHANCE OCCUPANT EXPERIENCE WITHIN THE MUSEUM INTERIOR AND EXHIBITION SPACE?**

- From this design intervention, strategies that could be employed to enhance occupant experience are evident in the spatial arrangement of the museum’s interior environments.

- Firstly, appropriate wayfinding is critical to promote active engagement within the museum setting, as if the learner is unable to understand the space and is unable to navigate to through exhibit, they will most likely become frustrated and in turn, generate a negative occupant experience for themselves and potentially others.

- Secondly, by providing opportunities for visitors to engage and partake in exhibits, the museum visitor actively becomes a part of the curation process. By allowing museum visitors to create and engage with the information allows for the occupant to grow attached to the museum and enhances their attitude towards the museum’s message.

- Thirdly, cooperative services such as workshops, resources, and dedicated gathering spaces for communities to enhance the occupant experience, as this would visibly create intrigue and generate spontaneous forums or discussions.

- Lastly, the integration of human-computer interactions (HCI) in The Interactive Museum of Technology and Digital Learning Centre’s interior environments encourages its visitors to learn passionately with the engaging information, allowing for moments of content exchange between the museum and the visitor. The museum’s subsequent design generates a potential for permanency to attract an audience and an active community of habitual visitors who care about the structure’s exhibits, objects, and the message that it presents.
FINAL THOUGHTS

In conclusion, allowing for potential experiences in a design is vital at every scale, from the individual's arrival to the departure from the structure. Physical spaces must accommodate multiple pathways and prioritize wayfinding to allow their visitors to explore the museum space openly.

In this advancing technological world, this project responded to the desire of a habitual museum audience, one that will become attached to their experiences in the museum and be motivated to return. By designing an engaging museum visitor experience, through its multitude of interior environments, this project established an interior environment that fosters constructivist learning – encouraging its visitors to interact with its educational programming. These experiences give attention to the application of human-computer interaction (HCI) and the integration of digital interpretive technologies in its interior environments.

While applying constructivist learning principles to the museum and its exhibitions, the act of testing the design through virtual reality, influenced how to successfully design a positive user experience for the museum visitor. This practicum illustrates for future designers how to support the museum visitor and a habitual audience by incorporating multiple modes of learning and representations in an educational environment, such as media, video, audio, tactile, and other active engagement. Additionally, this project should be viewed as technology-enabled spaces – and not technology-focused, as technology should be implemented in all spaces to primarily enhance user-learning, engagement and promote an overall positive user-experiences.

This project incorporated aspects and environments, such as the café, event space and makerspace, that encourage museum visitors to transition into a habitual audience and encourage visitors to become co-authors of the museum’s message, enabling their voices to be heard. Museums should continue to transform and push themselves as a community resource, one that is inclusive and adaptable for its diverse uses and users, allowing us to think of a museum as a place for social forum.

Although change is constant with technology, constructivist learning, and immersive educational hands-on experiences must first address the diverse and interconnected ways in which people learn. This understanding of how people engage and learn in museums will lead interior designers to new opportunities that incorporate emerging technologies and how to integrate them into the interior environment appropriately while respecting the learner.


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### ABBREVIATION LEGEND:

- **ACT** ACoustic TIlE
- **AL** ALUMINUM
- **AWP** ACoustIC WAll PANEl
- **CPT** CARPET/CArPET TIlE
- **CLG** CEILING
- **CT** CERamic TIlE
- **C/W** COMPLETE WITH
- **CONC** CONCRETE
- **CMU** CONCRETE MASONRY UNIT
- **DET** DETAIL
- **DIA** DIAMETER
- **DF** DRINKING FOUNTAIN
- **ELEV** ELEVATION
- **PT-E** EPOxy PAINT
- **EQ** EQUAL
- **EXT** EXTERIOR
- **EXP** EXPOSED
- **FA** FIRE ALARM (DEVICE)
- **FE** FIRE EXTINGUISHER
- **FEC** FIRE EXTINGUISHER CABINET
- **FD** FLOOR DRAIN
- **FIN** FINISH
- **FDN** FOUNDATION
- **F.O.** FACE OF
- **GB** GYPSUM BOARD
- **GL** GLASS/GLAZING
- **HDWD** HARDWOOD
- **HT** HEIGHT
- **HW** HARDWARE
- **LAM** LAMINATE
- **MAT** MATERIAL
- **MET** METAL
- **MIN** MINIMUM
- **MISC** MISCELLANEOUS
- **P** PAINTED
- **PLAM** PLASTIC LAMINATE
- **PLY** PLYWOOD
- **RSF** RESILIENT SHEET FLOORING
- **ST** STAIR
- **STL** STEEL
- **TB** TACKBOARD
- **TEL** TELEPHONE
- **TYP** TYPICAL
- **US** UNDERSIDE
- **WC** WATER CLOSET
- **WT** WEIGHT
- **WD** WOOD
- **WP** WATERPROOFING

### REFERENCE SYMBOL LEGEND

**REFERENCE SYMBOLS - INDICATIONS ON PLAN**

- **DETAILS**
  - TOP DIGIT (1) INDICATES DETAIL, ELEVATION OR SECTION NUMBER.
  - BOTTOM LEFT DIGIT (A101) INDICATES THE FIRST SHEET FROM WHICH IS TAKEN.
  - BOTTOM RIGHT DIGIT (A501) INDICATES SHEET ON WHICH DETAIL IS SHOWN.

- **SECTIONS**
  - TOP DIGIT (1) INDICATES DETAIL, ELEVATION OR SECTION NUMBER.

- **ELEVATIONS**
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  - BOTTOM LEFT DIGIT (A101) INDICATES THE FIRST SHEET FROM WHICH IS TAKEN.
  - BOTTOM RIGHT DIGIT (A501) INDICATES SHEET ON WHICH DETAIL IS SHOWN.

### ROOM, DOOR, MISC. & WALL NUMBERING & SYMBOL LEGEND.

**REFERENCE NUMBERING - INDICATIONS ON PLAN AND SECTION**

- **ROOMS**
  - ROOM NAME IF PRESENT ON PLAN
  - FIRST DIGIT INDICATES FLOOR
  - NEXT DIGIT INDICATES NUMBER

- **DOORS**
  - DIGITS INDICATE ROOM NUMBER THAT DOOR SWINGS INTO AND/OR SERVICES.
  - LETTER INDICATES DOOR NUMBER (IF PRESENT)
  - IF MORE THAN ONE DOOR SERVICES THE ROOM

- **KEY NOTES**
  - GENERAL NOTES FOR FLOOR PLANS & ELEVATIONS
  - SHEET SPECIFIC KEY NOTES

- **WALL TYPE**
  - INDICATES SPECIFIC WALL TYPE.
  - REFER TO WALL ASSEMBLY SHEET.

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**ABBREVIATION LEGEND:**

- **ACT** ACoustic TIlE
- **AL** ALUMINUM
- **AWP** ACoustIC WAll PANEl
- **CPT** CARPET/CArPET TIlE
- **CLG** CEILING
- **CT** CERamic TIlE
- **C/W** COMPLETE WITH
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- **MAT** MATERIAL
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- **MIN** MINIMUM
- **MISC** MISCELLANEOUS
- **P** PAINTED
- **PLAM** PLASTIC LAMINATE
- **PLY** PLYWOOD
- **RSF** RESILIENT SHEET FLOORING
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- **TEL** TELEPHONE
- **TYP** TYPICAL
- **US** UNDERSIDE
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**DRAWING INDEX & LEGENDS**

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</tr>
</tbody>
</table>

**G001**
SITE PLAN

Scale: As indicated
Date: 6/1/2020

SITE PLAN

DRAWING KEYNOTES:
1. ALUMINIUM PANEL CLADDING SYSTEM. LETTERING LASERCUT ON SITE-COLOURED LED ILLUMINATED CHANNEL LETTER SIGNAGE EACH SIDE ON WHITE PREFINISHED METAL BACKING. ASSEMBLY C/W CONC BASE AND PLING TO SUIT.

2. MUSEUM'S ADJACENT ASPHALT PARKING AREA OFFERS 3 HANDICAP PARKING, 44 VEHICLE AND 9 BUS PARKING SPACES.

3. MAIN ENTRANCE, PAINTED EXTERIOR FLOOR SYSTEM TO MATCH SIGNAGE CLADDING.

4. FIRE EXITS

SITE PLAN

ENTRANCE PLAN

0 4000mm 8000mm 12000mm 20000mm 28000mm

A001
INTERIOR WALL ASSEMBLY NOTES:

1. All gypsum board walls & ceilings shall be taped, sanded, primed & painted.
2. General contractor to provide proper 3/4” plywood blocking inside walls between studs for cabinets & shelving, and for washroom fixtures.
3. Refer to room finish schedules for finish layers to be provided in addition to assembly components listed below.
4. All joints and service penetrations through firewalls to be sealed with a 2 hour FFP firestop system.

GENERAL NOTES:

1. Stainless steel corner guards to be added at outside corners of walls and exposed ends of wall typical.
2. Doors to be installed min. 4" from inside corner of adjacent wall to inside face of frame, unless noted otherwise.
3. All areas of scope or disturbed by any installation shall be patched and painted if painting is required. Entire wall shall receive paint to avoid mismatch of colour.
4. Carry finishes to 4" above suspended ceilings or to underside of structural deck where no ceiling is provided.
5. Extend sound rated partitions to underside of structure. Perimeter joints & all penetrations sealed with acoustical sealant.
6. Stud partitions: dimensioned to face of stud, unless otherwise noted.
GENERAL NOTES:
1. ALL FABRICS AND MATERIAL TO MEET THE FLAME SPREAD RATING REQUIREMENT AND COMPLIANCE.
2. G.C. TO CO-ORDINATE WITH FURNITURE, MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATIONS AND SIZES OF EQUIPMENT - INCLUDING POWER FOR WORKSTATIONS.
3. SUPPLY & INSTALL 24" X 36" PLYWOOD BLOCKING FOR ADDITIONAL SUPPORT IN ALL WALLS THAT FEATURE DIGITAL MONITORS OR WALL MOUNTED EQUIPMENT.

DRAWING KEYNOTES:
1. PRESENTATION PODIUM
2. INFORMATION & TICKET KIOSKS EQUIPPED W/ RFID CAPABILITIES
3. INTERACTIVE KINETIC DIGITAL SCREEN WALL
4. STAFF SECURED & ACCESS ONLY
5. OVERHEAD DISPLAY MONITORS
6. POINT OF SERVICE SYSTEM
7. BRANDING WALL
8. MUSEUM GUIDE / MAP GRAPHIC
9. WATER FOUNTAIN & RECYCLING AREA
10. FIRE EXITS
11. LOADING DOOR
12. EQUIPPED AUTOMATIC DOOR & SWITCH
13. CARD READER
14. ENCLOSED TRACK SECURITY MESH GATE
15. STAFF TERMINAL / COMPUTER TERMINAL
16. UTILITY SHELF
17. CARGO FREIGHT LIFT
18. CHANGE STATION
19. PILOTIN - UNIVERSAL ILT WAVELENGTH LASER CUTTER
20. CEILING MOUNTED KUKA AXIS SYSTEM ROBOTIC ARM
21. WALL MOUNTED PEGBOARD SHELVING
22. WALL MOUNTED WHITEBOARD / TACKBOARD
23. 40" HEIGHT STORAGE LOCKER
24. OVERHEAD PROJECTOR
25. 3D PRINTER
26. STORAGE CUBBY SHELVING
27. WALL MOUNTED TOOL SHELVING
28. EXHIBIT ENTRANCE GRAPHIC
29. DID YOU KNOW EXHIBIT GRAPHIC
30. INTERACTIVE TABLE MONITOR
31. ROOM DECAL GRAPHIC
32. INTERACTIVE DIGITAL DISPLAY WALL
33. ASB LIMFLUX DIGITAL MEDIA GLASS PANEL FLOOR
34. CASework AR DISPLAY ENCASED IN AR GLASS
35. PHOTOCOPIER
36. HOW TO DECAL EXHIBIT GRAPHIC
37. 3D SCANNER STATION

LEVEL 01 FLOOR PLAN

Scale 1:200
Date 6/1/2020

A101.2
GENERAL NOTES:
1. STAINLESS STEEL CORNER GUARDS TO BE ADDED AT OUTSIDE CORNERS OF WALLS AND EXPOSED ENDS OF WALL TYPICAL.
2. DOORS TO BE INSTALLED MIN. 4" FROM INSIDE CORNER OF ADJACENT WALL TO INSIDE FACE OF FRAME, UNLESS NOTED OTHERWISE.
3. ALL AREAS OF SCOPE OR DISTURBED BY ANY INSTALLATION SHALL BE PATCHED AND PAINTED. IF PAINTING IS REQUIRED, ENTIRE WALL SHALL RECEIVE PAINT TO AVOID MISMATCH OF COLOUR.
4. CARRY FINISHES TO 4" ABOVE SUSPENDED CEILINGS OR TO UNDERSIDE OF STRUCTURAL DECK WHERE NO CEILINGS IS PROVIDED.
5. EXTEND SOUND RATED PARTITIONS TO UNDERSIDE OF STRUCTURE. PERIMETER JOINTS & ALL PENETRATIONS SEALED WITH ACOUSTICAL SEALANT.
6. STUD PARTITIONS: DIMENSIONED TO FACE OF STUD, UNLESS OTHERWISE NOTED.

INTERIOR WALL ASSEMBLY NOTES:
1. ALL GYPSUM BOARD WALLS & CEILINGS SHALL BE TAPED, SANDED, PRIMED & PAINTED TO BE PROVIDED IN ADDITION TO ASSEMBLY COMPONENTS LISTED BELOW.
2. GENERAL CONTRACTOR TO PROVIDE PROPER 3/4" PLYWOOD BLOCKING INSIDE WALLS BETWEEN STUDS FOR CABINETS & SHELVING, AND FOR WASHROOM FIXTURES.
3. REFER TO ROOM FINISH SCHEDULES FOR FINISH LAYERS TO BE PROVIDED IN ADDITION TO ASSEMBLY COMPONENTS LISTED BELOW.
4. ALL JOINTS AND SERVICE PENETRATIONS THROUGH FIREWALLS TO BE SEALED WITH A 2 HOUR “F” FIRESTOP SYSTEM.
GENERAL NOTES:
1. ALL FABRICS AND MATERIAL TO MEET THE FLAME SPREAD RATING REQUIREMENT AND COMPLIANCE.
2. G.C. TO CO-ORDINATE WITH FURNITURE, MECHANICAL, AND ELECTRICAL DRAWINGS FOR LOCATIONS AND SIZES OF EQUIPMENT - INCLUDING POWER FOR WORKSTATIONS.
3. SUPPLY & INSTALL 24" X 36" PLYWOOD BLOCKING FOR ADDITIONAL SUPPORT IN ALL WALLS THAT FEATURE DIGITAL MONITORS OR WALL MOUNTED EQUIPMENT.

DRAWING KEYNOTES:
1. PRESENTATION PODIUM
2. INFORMATION & TICKET KIOSKS EQUIPPED W/ RFID CAPABILITIES
3. INTERACTIVE KINETIC DIGITAL SCREEN WALL
4. STAFF SECURED & ACCESS ONLY
5. OVERHEAD DISPLAY MONITORS
6. POINT OF SERVICE SYSTEM
7. BRANDING WALL
8. MUSEUM GUIDE / MAP GRAPHIC
9. WATER FOUNTAIN & RECYCLING AREA
10. FIRE EXITS
11. LOADING DOOR
12. EQUIPPED AUTOMATIC DOOR & SWITCH
13. CARD READER
14. ENCLOSED TRACK SECURITY MESH GATE
15. STAFF TERMINAL / COMPUTER TERMINAL
16. UTILITY SHELF
17. CARGO FREIGHT LIFT
18. CHANGE STATION
19. PLASWAVE - UNIVERSAL WAVELENGTH LASER CUTTER
20. CEILING MOUNTED KUKA AXIS SYSTEM ROBOTIC ARM
21. WALL MOUNTED PEGBOARD SHELVING
22. WALL MOUNTED WHITEBOARD / TACKBOARD
23. STORAGE LOCKER
24. OVERHEAD PROJECTOR
25. 3D PRINTER
26. STORAGE CUBBY SHELVING
27. WALL MOUNTED TOOL SHELVING
28. EXHIBIT ENTRANCE GRAPHIC
29. DID YOU KNOW EXHIBIT GRAPHIC
30. INTERACTIVE TABLE MONITOR
31. ROOM DECAL GRAPHIC
32. INTERACTIVE DIGITAL DISPLAY WALL
33. ASB LUMIFLEX DIGITAL MEDIA GLASS PANEL FLOOR
34. CASework AIR DISPLAY ENCASED IN AIR GLASS
35. PHOTOCOPIER
36. HOW TO DECAL EXHIBIT GRAPHIC
37. 3D SCANNER STATION
GENERAL NOTES:
1. Stainless steel corner guards to be added at outside corners of walls and exposed ends of wall typical.
2. Doors to be installed min. 4" from inside corner of adjacent wall to inside face of frame, unless noted otherwise.
3. All areas of scope or disturbed by any installation shall be patched and painted. If painting is required, entire wall shall receive paint to avoid mismatch of color.
4. Carry finishes to 4" above suspended ceilings or to underside of structural deck where no ceiling is provided.
5. Extend sound rated partitions to underside of structure, perimeter joints & all penetrations sealed with acoustical sealant.
6. Stud partitions: dimensioned to face of stud, unless otherwise noted.

INTERIOR WALL ASSEMBLY NOTES:
1. All gypsum board walls & ceilings shall be taped, sanded, primed & painted.
2. General contractor to provide proper 3/4" plywood blocking inside walls between studs for cabinets & shelving, and for washroom fixtures.
3. Refer to room finish schedules for finish layers to be provided in addition to assembly components listed below.
4. All joints and service penetrations through firewalls to be sealed with a 2 hour "F" firestop system.
GENERAL NOTES:

1. ALL FABRICS AND MATERIAL TO MEET THE FLAME SPREAD RATING REQUIREMENT AND COMPLIANCE.
2. G.C. TO CO-ORDINATE WITH FURNITURE, MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATIONS AND SIZES OF EQUIPMENT - INCLUDING POWER FOR WORKSTATIONS.
3. SUPPLY & INSTALL 24" X 30" PLYWOOD BLOCKING FOR ADDITIONAL SUPPORT IN ALL WALLS THAT FEATURE DIGITAL MONITORS OR WALL MOUNTED EQUIPMENT.

DRAWING KEYNOTES:

1. PRESENTATION PODIUM
2. INFORMATION & TICKET KIOSKS EQUIPPED W/ RFID CAPABILITIES
3. INTERACTIVE KINETIC DIGITAL SCREEN WALL
4. STAFF SECURED & ACCESS ONLY
5. OVERHEAD DISPLAY MONITORS
6. POINT OF SERVICE SYSTEM
7. BRANDING WALL
8. MUSEUM GUIDE / MAP GRAPHIC
9. WATER FOUNTAIN & RECYCLING AREA
10. FIRE EXITS
11. LOADING DOOR
12. EQUIPPED AUTOMATIC DOOR & SWITCH
13. CARD READER
14. ENCLOSED TRACK SECURITY MESH GATE
15. STAFF TERMINAL / COMPUTER TERMINAL
16. UTILITY SHELF
17. CARGO FREIGHT LIFT
18. CHANGE STATION
19. PLASMA - UNIVERSAL WLT WAVELENGTH LASER CUTTER
20. CEILING MOUNTED KUKA AXIS SYSTEM ROBOTIC ARM
21. WALL MOUNTED PEGBOARD SHELVING
22. WALL MOUNTED WHITEBOARD / TACKBOARD
23. 40" HEIGHT STORAGE LOCKER
24. OVERHEAD PROJECTOR
25. 3D PRINTER
26. STORAGE CUBBY SHELVING
27. WALL MOUNTED TOOL SHELVING
28. EXHIBIT ENTRANCE GRAPHIC
29. DID YOU KNOW EXHIBIT GRAPHIC
30. INTERACTIVE LED EXHIBIT TABLE
31. ROOM DECAL GRAPHIC
32. INTERACTIVE DIGITAL DISPLAY WALL
33. ASB LIMIFLEX DIGITAL MEDIA GLASS PANEL FLOOR
34. CASework AR DISPLAY ENCASED IN AR GLASS
35. PHOTOCOPIER
36. HOW TO DECAL EXHIBIT GRAPHIC
37. 3D SCANNER STATION
38. GOOGLE CARDBOARD & RFID STATION
GENERAL NOTES:
1. STAINLESS STEEL CORNER GUARDS TO BE ADDED AT OUTSIDE CORNERS OF WALLS AND EXPOSED ENDS OF WALL TYPICAL.
2. DOORS TO BE INSTALLED MIN. 4" FROM INSIDE CORNER OF ADJACENT WALL TO INSIDE FACE OF FRAME, UNLESS NOTED OTHERWISE.
3. ALL AREAS OF SCOPE OR DISTURBED BY ANY INSTALLATION SHALL BE PATCHED AND PAINTED. IF PAINTING IS REQUIRED, ENTIRE WALL SHALL RECEIVE PAINT TO AVOID MISMATCH OF COLOUR.
4. CARRY FINISHES TO 4" ABOVE SUSPENDED CEILINGS OR TO UNDERSIDE OF STRUCTURAL DECK WHERE NO CEILING IS PROVIDED.
5. EXTEND SOUND RATED PARTITIONS TO UNDERSIDE OF STRUCTURE, PERIMETER JOINTS & ALL PENETRATIONS SEALED WITH ACoustical SEALANT.
6. STUD PARTITIONS: DIMENSIONED TO FACE OF STUD, UNLESS OTHERWISE NOTED

INTERIOR WALL ASSEMBLY NOTES:
1. ALL GYPSUM BOARD WALLS & CEILINGS SHALL BE TAPPED, SANDER, PRIMED & PAINTED TO PROVIDE PROPER 3/4" PLYWOOD BLOCKING INSIDE WALLS BETWEEN STUDS FOR CABINETS & SHELVING, AND FOR WASHROOM FIXTURES.
3. REFER TO ROOM FINISH SCHEDULES FOR FINISH LAYERS TO BE PROVIDED IN ADDITION TO ASSEMBLY COMPONENTS LISTED BELOW.
4. ALL JOINTS AND SERVICE PENETRATIONS THROUGH FIREWALLS TO BE SEALED WITH A 2 HOUR "F2" FIRESTOP SYSTEM.

LEVEL 04 CONSTRUCTION PLAN
Date 6/1/2020
Scale 1:200
N A104.1
GENERAL NOTES:

1. ALL FABRICS AND MATERIAL TO MEET THE FLAME SPREAD RATING REQUIREMENT AND COMPLIANCE.
2. G.C. TO CO-ORDINATE WITH FURNITURE, MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATIONS AND SIZES OF EQUIPMENT - INCLUDING POWER FOR WORKSTATIONS.
3. SUPPLY & INSTALL 24" X 36" PLYWOOD BLOCKING FOR ADDITIONAL SUPPORT IN ALL WALLS THAT FEATURE DIGITAL MONITORS OR WALL MOUNTED EQUIPMENT.

DRAWING KEYNOTES:

1. PRESENTATION PODIUM
2. INFORMATION & TICKET KIOSKS EQUIPPED W/ RFID CAPABILITIES
3. INTERACTIVE KINETIC DIGITAL SCREEN WALL
4. STAFF SECURED & ACCESS ONLY
5. OVERHEAD DISPLAY MONITORS
6. POINT OF SERVICE SYSTEM
7. BRANDING WALL
8. MUSEUM GUIDE / MAP GRAPHIC
9. WATER FOUNTAIN & RECYCLING AREA
10. FIRE EXITS
11. LOADING DOOR
12. EQUIPPED AUTOMATIC DOOR & SWITCH
13. CARD READER
14. ENCLOSED TRACK SECURITY MESH GATE
15. STAFF TERMINAL / COMPUTER TERMINAL
16. UTILITY SHELF
17. CARGO FREIGHT LIFT
18. CHANGE STATION
19. PLASMA - UNIVERSAL WAVELENGTH LASER CUTTER
20. CEILING MOUNTED KUKA AXIS SYSTEM ROBOTIC ARM
21. WALL MOUNTED Pegboard Shelving
22. WALL MOUNTED WHITEBOARD / TACKBOARD
23. 40 HEIGHT STORAGE LOCKER
24. OVERHEAD PROJECTOR
25. 3D PRINTER
26. STORAGE CUBBY SHELVING
27. WALL MOUNTED TOOL SHELVING
28. EXHIBIT ENTRANCE GRAPHIC
29. DID YOU KNOW EXHIBIT GRAPHIC
30. INTERACTIVE TABLE MONITOR
31. ROOM DECAL GRAPHIC
32. INTERACTIVE DIGITAL DISPLAY WALL
33. ASB LUMIFLEX DIGITAL MEDIA GLASS PANEL FLOOR
34. CASEWORK AR DISPLAY ENCASED IN AR GLASS
35. PHOTOCOPIER
36. HOW TO DECAL EXHIBIT GRAPHIC
37. 3D SCANNER STATION

LEVEL 04 FLOOR PLAN

Scale: 1:200
Date: 6/1/2020

A104.2
GENERAL NOTES:
1. TYPICAL CEILING GYPSUM WALLBOARD 9'-6" A.F.F. UNLESS OTHERWISE NOTED.
2. REFER TO ELECTRICAL DRAWINGS FOR SPECIFICATIONS AND TO COORDINATE LAYOUT OF LIGHTING FIXTURES.
3. FINAL CEILING HEIGHTS TO BE COORDINATED AND VERIFIED ON SITE.
4. USE OF EXPOSED STRUCTURE TO BE PAINTED WITH MIDNIGHT, 2131-206. REFER TO ROOM FINISH SCHEDULE.

DRAWING KEYNOTES:
1. SUSPENDED PROJECTION SCREEN
2. PLENUM ACCESS PANEL PAINTED TO SUIT CEILING. REFER TO ROOM FINISH SCHEDULE
3. SUSPENDED DIGITAL SCREEN

CEILING LEGEND:
- CEMENT BOARD
- ACROSTIC CEILING TILE 2'-0" X 4'-0"
- EXPOSED UNDERSIDE OF STRUCTURE
- LED RECESSED DOWNLIGHT 200mm
- SUSPENDED LED PENDANT 200mm 10'-0" A.F.F.
- SUSPENDED 25mm ACMIC TILES BAFFLE
- SUSPENDED LINEAR LED
- SUSPENDED TRACK, MULTIFUNCTIONAL MOUNTED LED TRACK LIGHT W/ MATTE DIFFUSER LENS 1500mm (200mm unit)
- SMOKE/HEAT/OCUPANCY SENSOR UNIT
- HVAC DIFFUSER
- LED RECESSED TROFFER 600mm x 600mm
- LED RECESSED TROFFER 1200mm x 600mm
- EMERGENCY LIGHTING
- SUSPENDED PENDANT DOME SECURITY CAMERA
- SPRINKLER
- EMERGENCY EXIT SIGNAGE W/ DIRECTION ARROW

LEVEL 01 REFLECTED CEILING PLAN
Scale 1:200
Date 6/1/2020
GENERAL NOTES:
1. TYPICAL CEILING GWB 9'-4" A.F.F. UNLESS OTHERWISE NOTED.
2. REFER TO ELECTRICAL DRAWINGS FOR SPECIFICATIONS AND TO COORDINATE LAYOUT OF LIGHTING FIXTURES.
3. FINAL CEILING HEIGHTS TO BE COORDINATED AND VERIFIED ON SITE.
4. USE OF EXPOSED STRUCTURE TO BE PAINTED WITH MIDNIGHT, 2131-20. REFER TO ROOM FINISH SCHEDULE.

DRAWING KEYNOTES:
1. SUSPENDED PROJECTION SCREEN
2. PLENUM ACCESS PANEL, PAINTED TO SUIT CEILING. REFER TO ROOM FINISH SCHEDULE.
3. CEILING MOUNTED AXIS ARM

CEILING LEGEND:
- GYPSUM WALLBOARD
- ACUSTIC CEILING TILE 2'-6" X 4'-0"
- EXPOSED UNDERSIDE OF STRUCTURE
- LED RECESSED DOWNLIGHT 200mm
- SUSPENDED LED PEDANT 200mm 10'-0" A.F.F.
- SUSPENDED 25mm ACOUSTIC FELT BAFTEL
- SUSPENDED LINEAR LED
- SUSPENDED TRACK, MULTIFUNCTIONAL MOUNTED LED TRACK LIGHT W/ MATTE DIFFUSER LENS 1500mm (492" unit)
- SMOKE/HEAT/OCCUPANCY SENSOR UNIT
- HVAC DIFFUSER
- LED RECESSED TROFFER 600mm x 600mm
- LED RECESSED TROFFER 1200mm x 600mm
- EMERGENCY LIGHTING
- SUSPENDED PENDANT DOME SECURITY CAMERA
- SPRINKLER
- EMERGENCY EXIT SIGNAGE W/ DIRECTION ARROW
- OVERHEAD FOCAL SPEAKER W/ ACOUSTIC FELT

LEVEL 02 REFLECTED CEILING PLAN
Scale: 1:200
Date: 6/1/2020
GENERAL NOTES:
1. TYPICAL CEILING GYPSUM 9'-6" A.F.F. UNLESS OTHERWISE NOTED.
2. REFER TO ELECTRICAL DRAWINGS FOR SPECIFICATIONS AND TO COORDINATE LAYOUT OF LIGHTING FIXTURES.
3. FINAL CEILING HEIGHTS TO BE COORDINATED AND VERIFIED ON SITE.
4. USE OF EXPOSED STRUCTURE TO BE PAINTED WITH MIDNIGHT, 2131-20. REFER TO ROOM FINISH SCHEDULE.

DRAWING KEYNOTES:
1. SUSPENDED PROJECTION SCREEN.
2. PLUMMA ACCESS PANEL, PAINTED TO SUIT CEILING. REFER TO ROOM FINISH SCHEDULE.

CEILING LEGEND:
- HVAC DIFFUSER
- LED RECESSED TROFFER 600mm x 600mm
- LED RECESSED TROFFER 1200mm x 600mm
- EMERGENCY LIGHTING
- SUSPENDED PENDANT DOME SECURITY CAMERA
- SPRINKLER
- EMERGENCY EXIT SIGNAGE W/DIRECTION ARROW
- SUSPENDED LIGHTFORM LF1 AUGMENTED REALITY PROJECTION DEVICE

LEVEL 03 REFLECTED CEILING PLAN
Scale 1:200
Date 6/1/2020
GENERAL NOTES:
1. TYPICAL CEILING DIV 9'-6" A.F.F. UNLESS OTHERWISE NOTED.
2. REFER TO ELECTRICAL DRAWINGS FOR SPECIFICATIONS AND TO COORDINATE LAYOUT OF LIGHTING FIXTURES.
3. FINAL CEILING HEIGHTS TO BE COORDINATED AND VERIFIED ON SITE.
4. USE OF EXPOSED STRUCTURE TO BE PAINTED WITH MIDNIGHT, 2131-20. REFER TO ROOM FINISH SCHEDULE.

DRAWING KEYNOTES:
1. SUSPENDED PROJECTION SCREEN.
2. PLENUM ACCESS PANEL, PAINTED TO SUIT CEILING. REFER TO ROOM FINISH SCHEDULE.

CEILING LEGEND:
- HVAC DIFFUSER
- LED RECESSED TROFFER 600mm x 600mm
- LED RECESSED TROFFER 1200mm x 600mm
- EMERGENCY LIGHTING
- SUSPENDED PENDANT DOME SECURITY CAMERA
- SPRINKLER
- EMERGENCY EXIT SIGNAGE W/ DIRECTION ARROW
- SUSPENDED TRACK, MULTIFUNCTIONAL MOUNTED LED TRACK LIGHT W/ MATTE DIFFUSER LENS 1500mm (200mm unit)
- SMOKE/HEAT/OCCUPANCY SENSOR UNIT
1. ACCESSIBLE WASHROOM AND ACCESSORIES AS PER NATIONAL BUILDING CODE 2010.
2. PLYWOOD BLOCKING TYP. BEHIND ALL WASHROOM ACCESSORIES.
# APPENDIX B1: MATERIAL SCHEDULE

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<th>CODE</th>
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## APPENDIX B2: ROOM FINISH SCHEDULE

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## APPENDIX B2: ROOM FINISH SCHEDULE

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APPENDIX C: BUILDING CODE ANALYSIS

NOTES:

BASED ON THE NATIONAL BUILDING CODE OF CANADA 2010 + MANITOBA BUILDING CODE AMENDMENTS.
PROJECT TO BE COMPRised OF ONE BUILDING, BASED ON MAXIMUM BUILDING AREA FOR SPRINKLERED BUILDING.
LOCATION: 48 ALBERT STREET
WINNIPEG, MB
NUMBER OF SURROUNDING STREETS: 1
SPECIAL HIGHS: NO
HIGH-RISE MEASURE: NO (UNDER 7 STOREYS)
4 STOREY WITH BASEMENT
AREA BUILDING: 2350m² (INCL. CAFE + BASEMENT)

3.1.17 OCCUPANT LOAD DETERMINATION

.1 BASED ON BUILDING AREA, OCCUPANCY TOTAL: 9.3m² = 100m² PER PERSON = 101 PERSONS
Cafe seating area: 65m² = 43 PERSONS MAXIMUM OCCUPANCY
THESE TOTAL LOADS ARE BASED ON MAXIMUM POTENTIAL OCCUPANTS.

3.1.2 OCCUPANCY CLASSIFICATION:

.1 MAJOR OCCUPANCY: A DIVISION 2 MUSEUM

3.1.5 NON-COMBUSTIBLE CONSTRUCTION

.10 ALL COMBUSTIBLE INTERIOR FINISHES, INCLUDING PAINT, AND OTHERS ARE NOT MORE THAN 1m THICK AND ALL OTHER FINISHES, [. . .] ARE PERMITTED IF NOT MORE THAN 25mm THICK, AND HAVE A FLAME-Spread RATING NOT MORE THAN (150) ON ANY EXPOSED SURFACE.

3.1.8 FIRE SEPARATIONS AND CLOSURES

.7 MAXIMUM OPENINGS: SIZE OF OPENINGS IN AN INTERIOR FIRE SEPARATION SHALL NOT BE MORE THAN 22mm, FIRE COMPARTMENTS ON BOTH SIDE ARE SPRINKLERED THROUGHOUT.
.11 SELF CLOSING DEVICES: EVERY DOOR IN A FIRE SEPARATION SHALL BE EQUIPPED WITH A SELF-CLOSING ELECTRONIC DEVICE DESIGNED TO RETURN THE DOOR TO ITS CLOSED POSITION TO PREVENT SMOKE AND HEAT TRANSFERANCE.

3.1.9 BUILDING SERVICES & FIRE RATED ASSEMBLIES

.7 PIPING, TUBING, DUCTS, CHIMNEYS, ELECTRICAL WIRES AND CABLES, TOTALY ENCLODED NONCOMBUSTIBLE RACEWAYS, ELECTRICAL OUTLET BOXES AND OTHER SIMILAR SERVICES THAT PENETRATE A MEMBRANE FORMING PART OF AN ASSEMBLY REQUIRED TO HAVE A FIRE-RESISTANCE RATING, OR A FIRE SEPARATION, SHALL BE TIGHTLY FITTED, OR SEALED BY A FIRE STOP SYSTEM.

3.2.7 LIGHTING REQUIREMENTS

3.2.7.1 EMERGENCY LIGHTING SHALL BE PROVIDED TO AVERAGE ILLUMINATION LEVELS OF NOT LESS THAN 10% AT FLOOR OR TABLE LEVEL IN THE FOLLOWING EXITS, ACCESS TO EXITS, CORRIDORS AND AREAS OF CONGREGATION.

3.3.2 NON-FIXED SEATING

3 NON-FIXED SEATING SHALL CONFORM TO THE NATIONAL FIRE CODE OF CANADA STANDARDS.

3.4 REQUIREMENTS OF EXITS

3.4.1A MINIMUM NO. OF EXITS REQUIRED: EVERY FLOOR AREA INTENDED FOR OCCUPANCY SHALL BE SERVED BY AT LEAST 2 EXITS. 5 PROVIDED.
3.4.1C DISTANCE BETWEEN EXITS (1/2 DIAGONAL): THE DISTANCE BETWEEN EXISTING EXITS FROM A FLOOR AREA SHALL NOT BE LESS THAN 1/2 OF THE DIAGONAL DIMENSION OF THE OPEN FLOOR AREA.
3.4.1D LOCATION OF EXITS (TRAVEL DISTANCE): MAX. 30m
3.4.2 EXIT WIDTH: MIN. WIDTH OF EXITS SHALL BE 915mm FOR DOORWAYS.
3.4.2.1 TOTAL EXIT STAIR WIDTH: PROVIDE AT LEAST MIN. 1200mm STAIR PATH WIDTH.
3.4.4 HEADROOM CLEARANCE: PROVIDE CLEAR HEIGHT, NO LESS THAN 2050mm.
3.4.1(1) FIRE SEPARATION - EXITS: MIN. 1 HR FRR. CLOSED STAIRWELL
3.4.2 EXIT THROUGH LOBBIES NO EXIT FROM A FLOOR AREA BELOW THE FIRST STOREY SHALL LEAD THROUGH A LOBBY.
3.4.5 EXIT SIGNAGE YES, EVERY BUILDING DOOR WILL HAVE AN EXIT SIGN PLACED ABOVE OR ADJACENT TO THE EXIT.
3.6.5 GUARDS/RAILINGS: NON-COMBUSTIBLE ASSEMBLY. TO COMPLY: NO HORIZONTAL COMPONENTS ABOVE 100mm.
3.8.1 DOOR SWING IN EXIT: ALL EXIT DOORS TO OPEN IN DIRECTION OF TRAVEL.

3.7 HEALTH REQUIREMENTS

3.7.2 WATER CLOSETS: "UNIVERSAL MULTI-STALL WASHROOM" THE FOLLOWING UNIVERSAL MULTI-STALL WASHROOMS CONFORM TO NBC'S REQUIRED WATER CLOSET CALCULATION AND CITY OF WINNIPEG'S UNIVERSAL DESIGN POLICY - PROMOTING INCLUSION, ACCESSIBILITY, IDENTITY AND DIVERSITY.
THE MINIMUM OF WATER CLOSETS FOR UNDER 200 PERSONS IS TWO (2) MALE AND THREE (3) FEMALE WATER CLOSETS.
3.7.3 LAUVERTORIES: THE UNIVERSAL MULTI-STALL WASHROOMS SHARE A COMMUNAL HAND-WASHING STATION AND ADHERES TO NBC'S FACET CALCULATION REQUIREMENT. ADDITIONALLY ADHERES TO 3.8.3.11 BARRIER-FREE CLEARANCES AND GUIDELINES.

3.8 BARRIER FREE

3.8.1 ENTRANCES: NOT LESS THAN HALF OF THE PEDESTRIAN ENTRANCES OF THE BUILDING SHALL BE BARRIER-FREE AND SHALL LEAD FROM THE OUTDOORS AT SIDEWALK LEVEL OR FROM AN ACCESSIBLE RAMP.
3.8.1.1 PATH OF TRAVEL: THE UNOBSTRUCTED WIDTH OF A BARRIER-FREE PATH OF TRAVEL SHALL BE NOT LESS THAN 915mm.
3.8.2 BARRIER-FREE "UNIVERSAL MULTI-STALL WASHROOM" ONE (1) BARRIER-FREE UNIVERSAL TOILET STALL SHALL BE PROVIDED, ADHERING TO TYP. UTR CLEARANCES.
BE EQUIPPED WITH GRAB BARS. HAVE A CLEARANCE OF 30mm BETWEEN THE FIXTURES AND THE WALL.
BE EQUIPPED WITH A COAT HOOK, MOUNTED NOT MORE THAN 1200mm ABOVE THE FLOOR ON A SIDE WALL AND, PROJECTING NOT MORE THAN 60mm FROM THE WALL.
3.8.3 DOORWAYS AND DOORS: EVERY DOORWAY THAT IS LOCATED IN A BARRIER-FREE PATH OF TRAVEL SHALL HAVE A CLEARANCE WIDTH, NO LESS THAN 915mm WHEN THE DOOR IS IN THE OPEN POSITION: A DOORWAY THRESHOLD SHALL NOT BE MORE THAN 15mm HIGHER THAN THE FINISHED FLOOR SURFACE AND SHALL BE BEVELLED TO FACILITATE EASE OF PASSAGE FOR WHEELCHAIR USERS.
GROUP A OCCUPANCY MANDATES THAT EVERY DOOR SHALL PROVIDE A BARRIER-FREE PATH OF TRAVEL (THROUGH AN ENTRANCE), SHALL BE EQUIPPED WITH A POWER DOOR OPERATOR ALLOWING THE USER TO ACTIVATE THE OPENING OF THE DOOR FROM EITHER SIDE.
THE FLOOR SURFACE ON EACH SIDE OF THE DOOR IN A BARRIER-FREE PATH OF TRAVEL SHALL BE LEVEL WITHIN A RECTANGULAR AREA AND ADHERE TO THE DOOR'S WIDTH X 1500mm LENGTH.
3.8.6 SPACES IN SEATING AREAS ALLOCATE AND PROVIDE DESIGNATED SPACES IN FIXED SEATED AREAS.

9.6.5 GLASS

4 VIABILITY OF GLASS & TRANSPARENT DOORS: EVERY GLASS OR TRANSPARENT DOOR ACCESSIBLE TO AND USED BY THE PUBLIC SHALL BE EQUIPPED WITH HARDWARE, BARS OR OTHER PERMANENT FIXTURES DESIGNED SO THAT THE EXISTENCE AND POSITION OF SUCH DOOR WILL BE READILY APPARENT.
AS PER 3.1.3.19(1). GLASS DOORS TO BE EQUIPPED WITH EXIT HARDWARE AND TEMPERED GLASS.