

## **I Abstract**

Many people now typically spend a portion of their day in detached and dispassionate built environments. Such environments can produce mental stress, restlessness, and dissatisfaction. Static facilities that harbor such routines should accommodate to the occupants' needs. Many of these built environments tend to ignore our inbuilt human need for sensory variety, but many spaces are typically designed to solely be visually appealing, ignoring the other senses. Engaging with only our visual senses and not the others doesn't help the users feel connected to their spaces; our eye works together with our body and other senses to help strengthen our sense of reality.

Considering this, shouldn't it be critical to design a multisensory space that harmonizes with the occupants, an affectionate, sensory sympathetic space? Perception of our environment is always mediated by our senses. A simple way to engage the senses is the use of indoor horticulture; plants activate our sense of smell, touch, hearing, and sight. Proponents of the theory of biophilia argue that humans have an innate connection to living systems, such as other humans, animals and plants. Using the concept of biophilia as a point of departure to create a multisensory spacescape can help give more meaning and spirit to interior environments.

Introducing natural elements, such as plants, indoors undoubtedly helps improve the indoor air quality but it will also help evoke positive responses in people. Intervening a living system into a facility can encourage social engagement. A series of orchestrated interventions can help reveal the influences and impacts that plants have to enhance sensory experiences in interior public spaces. Proximity, versatility, visual access and exposure define the possibilities and limits of the interventions. Analyzing the engagement that occupants have with these interventions will help to identify and develop design recommendations. These temporal interventions will be executed in the 2nd floor student lounge located within Hayes Hall. It is an ideal location due to the heavy foot traffic, accessibility, and access to daylight. Further, it was intended to provide opportunities for social engagement.

The involvement and experiences that these interventions may cultivate can be far more significant than the shell that happens to house them. Each intervention will generate different qualities of engagement. Some would encourage occupants to tend to the plants while others may encourage occupants to rearrange them. Observing and documenting the behavior associated with the interventions will identify the potential for using horticulture as a purposeful element of built environments in addition to simple decoration.

## II Literature Review

### *Sensory Relationships*

For a while, designers usually create with vision as their forefront. Built environments that only engage our eyes doesn't help users feel connected to their spaces. Juhani Pallasmaa tackles this bias towards vision and the suppression of the other senses in his text "The Eyes of the Skin". The engagement of our other senses in architecture plays a very significant role. It informs us of our presence and existence in space. Our body utilizes our senses to navigate through space. It also connects us to how we perceive and interact with the space we occupy, as well as the capacity of our thoughts. (Pallasmaa 2005)

The contents and elements of a space not only complement, but should also help fabricate the soul of a space. A "good space" isn't simply defined by just the tangible, but also the culture, rhythm, the dances, the essence of the space. (Malnar; Vodvarka 2004) The built environment serves many functions for humans and their day to day routines. It obviously provides shelter, but it is also a space where they interact with others and where they carry out their activities.

Many built environments now have been much more conscious in terms of incorporating design characteristics that supplement the user's' daily tasks. They incorporate sunlight, openness, flexibility, advanced technology, climate control, and acoustics into their spaces. However, several interiors of built environments unfortunately don't have this sort of privilege. Not to say that all facilities are sensory deprived, but there can be ways to enhance the experience of them if needed. In Akiko Busch's book, "The Uncommon Life of Common Objects", she brings up the idea of how objects can unknowingly affect our surroundings. The intimate relationships that we have with these objects can foster something much grander. It reveals humane and genuine moments that "tell a story not only about them but also about the rooms, the landscapes that they inhabit." (Busch 2004) With this idea in mind, one could argue that artefacts do have the power to alter or enhance our sensory experiences in a space. Aside from being just decoration, indoor horticulture can have this power.

### *Biophilia*

The field of biophilia hypothesizes that human beings possess an inherent affection for living systems; whether it be other human beings, animals, or plants. The hypothesis of biophilia was first discussed and explained by biologist Edward O. Wilson, a Harvard professor, in 1984. This fondness relates to the positive responses when people are in close proximity of other living systems. (Ulrich 1993) The emotional reactions, physical and cognitive responses to the exposure of nature has been researched and validated in many disciplines. However, biophilia concerns more about the genetic foundation that associates with those positive responses.

The research into biophilia hasn't sparked anything new. Rather it has provided a clearer understanding of humans' attraction to the natural environment, the affiliation of improved wellness and well being of one's psychological state, productivity, as well as emotional state. It gives more of a reason for built environments to be designed with natural elements, utilizing biophilia as a motive. Several cities propose to implement biophilia into their systems in attempts to create a biophilic cities.

The idea of a biophilic city includes lush greens of various scales where citizens can also be actively involved with the nature. It allows for "urbanites" to be exposed to native foliage and reveals the potentials of how the city can include more greenery. A biophilic city can be executed through our infrastructure roofs, patios, small urban gardens, walls, and etc. (Beatley 2010) A good example would be Patrick Blanc, a french botanist, who designed and fabricated several green walls in Paris, Italy, and other countries. Incorporating such designs has demonstrated its social benefits; the walls evoked amazement wonderment, engagement, and participation. Being a part of a biophilic city sounds like something out of a fairy tale. It may seem impossible to do, but it is gradually getting there, many cities are taking steps towards it. Described are the benefits and strategies of how to develop a biophilic city, however these recommendations could also be scaled down to be better fit for facilities.

Much like a garden, a biophilic city can be viewed as a mediator between architecture and nature. Usually, gardening has the unfortunate usual connotation of merely a chore which would also pair with back breaking work and soiled knees. And some would view a garden as tamed nature. The place of a garden could also be seen as a clearing of a space that allows for reflection, for people to become aware of the edge condition between nature and the built. The birth of a garden is conscious, it requires *place* and human intervention. "A deliberately planted tree in a clearing or space in the forest certainly reflects intentional action, but without continued acknowledgement of its existence it becomes another tree in the forest, no longer able to claim the right of place. It is at the complete mercy of nature untamed." (Giesecke, Jacobs 2012)

#### *Plants in the Built Environment*

Aside from emotional and social benefits, biophilia also contribute psychological and physiological benefits. The effects that plants have on people's well being has been researched extensively in several disciplines. With the presence of plants, people have been reported to be less fatigued while in an office setting. When presented with options, plants were of higher preference opposed to none. (Raanaas 2010) Considering the fact that the physical environment has a significant impact on one's health and wellbeing, the implementation of plants in built environments was emphasized when it came to health care facilities. Mainly due to the fact that these environment's main purpose is to heal people, studies were conducted to reveal more ways to improve the wellbeing of these facilities.

In environments that are known to be associated with stress and anxiety, applying natural elements into the space gives the user the ability to be exposed to the healing and restorative properties. Natural elements such as plants has the potential to help reduce stress as well as induce the sense of cheerfulness and pleasantness. Studies have been executed to test the theories of indoor plants

### *Case Studies*

## **III Methodology**

The primary objective of observational studies, such as interventions, is to test out proposed hypotheses. They help test the efficiency and the impact of each hypotheses. The interventions that will be carried out gives users the opportunity to interact with the horticulture; they can tend to them or they can rearrange the planters to their liking. The series of interventions are designed with the intention of engagement. Each one is devised accordingly to their hypotheses. The hypotheses being proposed tackle different assumptions of engagement from the users:

*Hypothesis 01\_* people will engage with the plants more if they are in closer proximity

*Hypothesis 02\_* people will adjust their environment

*Hypothesis 03\_* extreme intervention is needed to encourage people to engage with the plants

There are many ways in which the results could be observed; controlled, natural, or participatory. In this thesis, the interventions will be under naturalistic observation. The main benefits of naturalistic observation is the unobtrusiveness. By studying the natural and spontaneous behaviors of the users in the setting, it decreases the chances of The Hawthorne Effect taking into affect. The Hawthorne Effect is the alteration of one's behavior due to their awareness of being observed. Considering the ecological validity, it is preferable to utilize the naturalistic method. Observing the spontaneity of the behaviors may also uncover new attributes of horticulture engagement. However, there are limitations to this method; the variables cannot be controlled and there is a lack of ability to define the demographic of the users.

The observations will be execute by me personally as well as through photo documentation. User's engagement with the horticulture will be acknowledged by \_\_\_\_\_ using a check list? \_\_\_\_\_. Engagement implies acknowledgement of the horticulture by the users; this ranges from stroking the plants to abducting the plants as a whole.

Introduce the overall methodological approach for investigating your research problem. Is your study qualitative or quantitative or a combination of both (mixed method)? Are you going to take a special approach, such as action research, or a more neutral stance?

- Indicate how the approach fits the overall research design. Your methods should have a clear connection with your research problem. In other words, make sure that your methods will actually address the problem. One of the most common deficiencies found in research papers is that the proposed methodology is not suitable to achieving the stated objective of your paper.
- Describe the specific methods of data collection you are going to use, such as, surveys, interviews, questionnaires, observation, archival research. If you are analyzing existing data, such as a data set or archival documents, describe how it was originally created or gathered and by whom.
- Explain how you intend to analyze your results. Will you use statistical analysis? Will you use specific theoretical perspectives to help you analyze a text or explain observed behaviors? Describe how you plan to obtain an accurate assessment of relationships, patterns, trends, distributions, and possible contradictions found in the data.
- Provide background and a rationale for methodologies that are unfamiliar for your readers. Very often in the social sciences, research problems and the methods for investigating them require more explanation/rationale than widely accepted rules governing the natural and physical sciences. Be clear and concise in your explanation.
- Provide a justification for subject selection and sampling procedure. For instance, if you propose to conduct interviews, how do you intend to select the sample population? If you are analyzing texts, which texts have you chosen, and why? If you are using statistics, why is this set of statistics being used? If other data sources exist, explain why the data you chose is most appropriate to addressing the research problem.
- Describe potential limitations. Are there any practical limitations that could affect your data collection? How will you attempt to control for potential confounding variables and errors? If your methodology may lead to problems you can anticipate, state this openly and show why pursuing this methodology outweighs the risk of these problems cropping up.

- Interventions (Why interventions)
  - To calibrate/measure
  - Interventions have been utilized in many
- What precedents I am looking at
  - Any precedents that involve interventions
- What are my own planned interventions?
  - Sq footage of plants
  - What kind of plants? Indoor and why?
  - Passively - to not intrude with results
- Research design
  - Research questions
  - Hypotheses
  - Research methods
- Observations
  - Frequency of use
  - Duration of use

Satisfaction of use

Initiation of communal understanding/?

- Documentation and visualization of findings