Health and Well-being in Built Environment-Biophilic Design

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***Abstract*— Architecture and built environment to be studied with Biophilic design elements which improves the cognitive function and creativity to improve our wellbeing and expedited healing as the urbanization is increasing in the world. The architecture and planning that represents the relationship of human biological science and nature is known as Biophilia. Design Considerations alike (e.g., scale, climate, user demographics) influence biophilic design decisions for better clarity to why some proposals are replicable and why others may not be. The biophilic patterns has a set of tools to understand the design and the prospects, which includes roots of the scientific approach of every pattern, has to be used with the metric strategies and design considerations for using each pattern. It's a restorative design process that tries to reconnect us with nature. The adoption of Biophilic design patterns creates an opportunity for people to work with less stress and create overall health and wellbeing. Scientists and designers are collaboratively working to create a perfect perfect balance between humans biological and physiological connection with nature. This paper is the framework for biophilic design that reflective of nature-health relationships. The Biophilic design patterns are studied under three main headings 1. Nature in the Space Patterns,2. Natural Analogues Patterns 3. Nature of the Space Patterns with 14 patterns discussed under them in detail and its advantages which positively impact on health and also strengthen the empirical evidences for human nature connection The paper concludes as to how the biophilic design patterns become important for people living in cities than on countryside. The paper encourages the designers to adapt Biophilic patterns into a vision for healthy homes, workplaces and cities. Thus, enhancing our lives through the connection of nature.**

Keywords*— *Nature, patterns, built environment, Nature-Health relationships, well-being.

INTRODUCTION

Biophilic architecture is part of the innovative concept of architecture, which is deeply rooted with the fields of human health, ecology, and sustainability. Development to be optimally compatible with the material of other creations. The green area and coverage depend mainly on the occupation category under that area. The biophilic architecture is construed and has the dimensions of the environmental , culture , social and region. It also looks into the moral, economic aspects an provides an advantage. There is a lot of gap in understanding the energy, environmental life cycle processes for the designers to adapt green architecture and create biophilic communities. In the urban designed biophilic environments, people can experience a psychological peace by relieving mental fatigue and reducing their stress levels. This procedure improves the well-being of the people. The use of natural components and processes as design inspiration in a built environment is promoted by biophilic design. The idea is that natural environments and individualities are exposed to positive health and well-being effects reinforced by research in a wealth of areas. Study hypothesis indicates that these effects or the positive behaviour of the humans is due to the biological connection between natural world and humans. The two environmental psychology theories where these ideas are studied as

1. Attention Restoration Theory
2. Stress Recovery Theory

Both theories show that certain environments are stressful, others are not stressful and yet others can help people actively recover from stress and tiredness. Evocative environments positive moods can have appeal without being difficult or stressful, for helping people recover from mental fatigue and stress more quickly Over time, urban spaces change constantly. The aspects of city areas but also the historical, cultural, social, and economic aspects of a city are important to their use. Presently, urban researchers concentrate on the social and cultural aspects and the connections between urban communities.

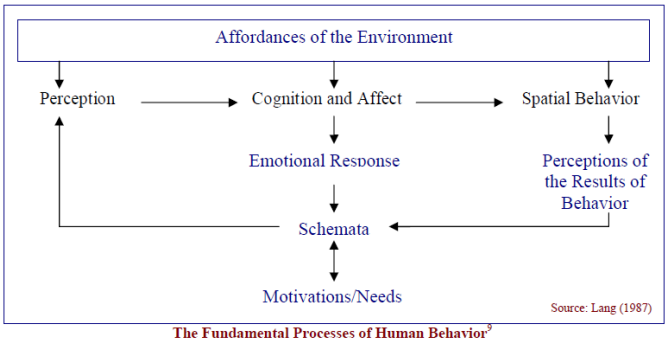
BIOPHILIC DESIGN

The Biophilic design and the biophilic theory refers that we humans have stronger affinity and biological need to connect with nature, living systems and processes. Research on the topic has demonstrated that the strong connection impacts on our personal wellbeing, productivity and societal relationships. The fact that large percentage of the global population are living in urban areas, to understand these connections and the importance in architectural design approach is very evident. The biophilia and the biophilic design is ingrained into the research, this includes a translation of lessons learned from experience and analysis of projects through the lens of biophilic design. It explores the role architecture and architect can have in enhancing the human-nature connection to both a general and project specific design approach, preparing a framework and scheduling the methodologies for the analysis and to understand and execute the design process in architecture. As part of the uninterrupted refinement, the developing ideas to see how this biophilic design approach can inform and connect a program, context and architectural response to meet the design goals of a project in reconnecting and enhancing the human-nature connection. As a result, nurturing and enhancing a biophilic connection and creating possibilities for arrangement through the architecture that did not otherwise exist.

ARCHITECTURE AND HUMAN BEHAVIOR

Any definition or description of the environment has to be with reference to something surrounded by either nature or manmade it is also said that, Architecture is referred to as the third skin to

humans, the first one being the real skin and the second being the cloth and the third being the built form in which they perform their activities. The building in which they perform their activities should be according to the needs and comply with the user. The architect creates a environment for the human behavior. The end users will appreciate his/her environment when the built form is configured in a particular pattern. The architectural environment where the core activities take place people not only modify it actively to suit their needs. The needs also vary with time, situation and persons.



The Fundamental Processes of Human Behavior[3]

HUMAN-NATURE RELATIONSHIP AND ITS IMPACT ON HEALTH

Within the past four decades, research has been increasingly drawn toward understanding whether there is a link between the changing human–nature relationship and its impact on people's health. A multidisciplinary approach and research is essential for understanding the breadth and under lying mechanisms. Based on the World health organization definition the concept of chronological health is explored. A Conceptual model is developed based on these concepts, the human nature relationship and its impact on human health. The use of multidisciplinary perspective will facilitate deeper understanding of the complexities involved in attaining optimal health and human environmental interface.

Effects of Green building elements

Green elements are still generally regarded by some "green people" as an undamaged visual element in architecture. Green elements actually help to improve the microclimate by evaporation, Reducing the pollution in air and roof top temperature decreases. To improve the microclimate as well as the indoor climate the retention of the rain water with in the site is important. The important aspects are the summer cooling effect, the winter heat effect and the increase of the green zone for a lifetime. The function of the green roof differs according to seasons as discussed below:-

- **In summer**

Evaporation results in creating cooling effect abd shading the vegetation, but also its ability to reflect solar radiation and energy consumption via photosynthesis and its embedded water heat storage. A plant life surface reduces the thermal intensity normally occurring on the city's black building surfaces. Green building elements significantly enhances the lower energy consumption in hot urban environments by using properties of the water proof layer. The usage of the plants or green cover offering maximum radiation from the sun is applied on these and the humidity in the plant is splashed. More the exposure of the surface of leaves. More will be the natural cooling effect. Shrubs and trees form a better green cover refrigeration than soil covers. The soil covers to be more effective the depth has to be increased which also increases the load imposed. The load will finally determine the potential of energy decline.

- **In winter**

The air pillow in the plants serves as a thermal insulator, and the fact is that cold wind hardly hits the earth's surface. In the winter, heating effect occurs. The thick layer of vegetation like fur, effectively increases the thermal insulation effect of the building elements. The thermal mass of the earth layer, reflecting infrared house-building radiation and the production of heat in the morning when dew is formed are some minor effects When the air temperature reached -11 degree Celsius, the temperature on the Planet was -2 degree Celsius, and when the air temperature reached -14 degree Celsius, it was just 0 degree Celsius below 16 cm of the Earth. At the same time, the temperature on the field under the grass was found to be -3degree C.

Patterns of biophilic design Terrapin Bright Green LLC, a multidisciplinary consulting firm, conceptualized this trend

- Nature of Space Patterns
- Natural Analogues
- Nature of the Space

These three key pillar's principle are further subdivided into fourteen biophilic design sub patterns, where they have been extensively clarified in terms of the involvement they generate, the origins of patterns, design features, instances, and connections with the other patterns, contribution possibilities for integrated biophilic design strategies.

The 14 Patterns of Biophilic design patterns and the influence on the health:

Nature in the Space

1. Visual Connection to Nature
   - Improved mental engagement
   - Seeing health, it had very positively impact on human attitude.
2. Non-Visual Connection to Nature

- Deceptive mental wellbeing and tranquility changes
- It reduces stress and pressure

3. Non-Rhythmic Sensory Stimuli

- Acquiescence and exploration measures observed and quantified
- Impacted on heart rate, nervous system and blood pressure in a good way

4. Thermal & Airflow Variability
   - Impacted positively on well-being and comfort
5. Presence of Water
   - Enhanced memory and attention restore, improved vision and psychological reaction
   - Decreases stress, lower heart rate and blood pressure
6. Dynamic & Diffuse Light
   - Increased visual comfort
7. Connection to Natural Systems
   - Enhanced proactive health reactions and changed environmental awareness

Natural Analogues

8. Biomorphic Forms & Patterns
   - This pattern provides comfort.
9. Material Connection to Nature
   - Better comfort and reduced blood pressure
10. Complexity & Order
    - Impact positively on psychological stress

Nature of the Space

11. Prospect
    - It reduces irritation and mental fatigue.
    - Enhanced comfort level and reduces stress.
12. Refuge
    - Improved concentration and attention
13. Mystery
    - Generated tough response to injury
14. Risk/Peril
    - Generated strong response to injury

Inferences from Case studies

- Longer facades of the building have to be oriented towards North- South direction preventing harsh sun rays into the interiors and provides thermal comfort.
- Daylighting from multiple angles provides a different ambience.
- Strategic usage of skylights and translucent materials like fibre glass sheets, producing diffused lightning to interactive spaces.
- Vertical shading devices to be placed in North direction to prevent entry of harsh sun to the interiors and to provide shade to the open interactive spaces between the built forms.
- Orientation of building form to shade interiors and facilitate self-shading by neighboring buildings, cantilevers, and overhangs. Dense and seasonally varying landscape to be adopt for improving the microclimate of the spaces, also to provide shade to the open interactive spaces.
- Planned usage of glazing about south which brings diffused light useful for setup

CONCLUSION

The basic goal of biophilic architecture, in all its construction programs, is to outline and structure characteristics simply and sensibly so that developers, builders, planners, and architects can learn the importance of connecting to the natural environment. People must protect nature and ecological health in order to uphold and enhance their mental health and well-being. It is ironic for urban planners to integrate nature into designed landscapes, but first and foremost, it is the built world that has lost the prominent advantages of natural environments. On the other hand, the constructed world gives local people a more stable existence by protecting them from natural disasters and weather. Urban spaces in the streets with Particle Clear should have accommodations for city inhabitants and should be built to take account of the positive results as well as the negative results. Environmental psychology and public health have given various data on the connection between nature and well-being to which helps to strengthen people's mental health. The planners aim should translate these ideas and facts into functioning spaces. Since happiness is a public expression, urban planner must approach the design of public spaces as restorative spaces as soon as possible.

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