



Impact of Biophilic Design on Health and Wellbeing

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ABSTRACT: A growing body of an individual indicates that the modern world has been disconnecting from nature which is having a negative impact on human health and wellbeing. The biophilic theory is the newest also it is least understood, but it holds a lot of potentials.

A deeper explanation is required to understand the concept of biophilic. The theory of this study leads to positive answers even on emotional conditions, regarding human performance and health. The study expands the current understanding of the role of the environment in human nature and health. Biophilic has an extensive scope of applicability in various domains of architectural spaces like residential, commercial, and institutional building uses also having various types of health benefits related to various problems of a particular territory.

The study aims to assess the impact of biophilic design on environment knowledge and relation with nature. The movement aims to build an energy-efficient building and develop environmentally friendly by managing natural resources effectively. Also, analyze the impact of biophilic design and its relationship with environmental awareness and nature.

The study resulted that health and nature are related to god's faith. It gives a huge positive impact and nature cannot be ignored as a valuable source of health and happiness.

INTRODUCTION

Biophilic architecture is part of the new concept of architecture, which is deeply involved in the fields of human health, ecology, and sustainability. Formation to be optimally compatible with the material of other constructions. The green area and coverage depend mainly on the function category under that area. However, biophilic architecture must be interpreted and finished to have an environmental and cultural regional dimension. This provides an exciting opportunity for environmental, moral, social, and economic advantage. There is information left to understand on energy, environmental, and life cycle processes to engage young and enthusiastic researchers in the world's green architecture and biophilic architecture communities.

In urban biophilic environments, people can gain psychological experience by relieving mental fatigue and reducing their stress levels. This process improves the well-being of the people.

The use of natural components and processes as design inspiration in a constructed environment is promoted by biophilic design. The idea is that natural environments and characteristics are exposed to positive health and well-being effects supported by research in a wealth of areas. Study hypothesis states that these positive effects from natural exposure are due to a biological connection to the natural world between humans.

These ideas have been advanced in two Environmental Psychology theories: Attention Restoration Theory and 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 attractiveness without being demanding or stressful, It is known that helping people recover from mental fatigue and stress more quickly

Over time, urban spaces change constantly. Not only the function of city areas but also the historical, cultural, social, and economic aspects of a city are important to their use. Currently, urban researchers concentrate on the social and cultural aspects and the connections between urban communities.

BIOPHILIC DESIGN

Though Biophilic originates in biological science, Wilson (2008) knows that this term brings together disciplines, for example in biology, social sciences, and design, as an explanation of causes and effects. Inclusion of social aspects can be based on the complexity of biophilic by taking into account cultural and ethnic differences between people and groups as well.



In the book of Edward O. Wilson, a renowned biologist coined the term biophilic (1984). Biophilic is the inherent urge of people to associate themselves with nature and other life processes. These urgent and aesthetic criteria are called for the desire for a more livable living environment. It is an integral part of human development and physical and psychological growth. As a result, people are looking for opportunities to enjoy nature outside cities, as these are areas where this type of refreshing food is generally not offered, such as tropical forests.

The built environment historically was integrated into the natural environment and the local aesthetics and history of this type of culture typically comprise local materials and processes. Today, Flora and fauna that are vital to the biophilic approach are not used to protect the local materials, nor local vegetation. Kellert et al. (2008) argue that the intrinsic human affinity of biophilic design is used to incorporate natural and local things into the design of build environments. People have given nature different values according to their function, such as their physical support, experience and curiosity, knowledge of systems and structures, their communication and expression, imitation of their mechanic, spiritual respect, and the connection of their affiliation.

The Brundtland Report challenges future development to sustainably grow, has inspired various biology perspectives of design over the last two decades. Initiatives on closed-loop industrial cycles, such as buildings, living organisms, or biological inspiration to approach natural structures and development processes of efficiently and innovatively designed objects, are some examples of these revolutionary approaches. The goal of these outlooks is to search for energy efficiency, clean industrial production, product innovation, and design methodology based on biological mechanisms and living interactions.

INTERACTION BETWEEN ARCHITECTURAL COMPOSITION AND HUMAN ATTITUDE

Through its complex activities, the role of architectural composition is to create a material framework of organized space to meet the material also the spiritual needs of individuals and also of society. Over the ages, the man has used his ingenuity to ensure safe, warm, and weather protection in his protective space. It is not only a roof, for example, but a house, the place where the moral climate is formed and where the family spirit lasts. The settlement is not just the system of connection, which allows existence and the continuation of species, it is also a complex way of expressing a deeper need for a man as a spiritual being to communicate and to unfold his activities in a sufficient climate moral, cultural and energetic. Architecture depends on the successful balance between intuitive and rational, as well as any other design activity.

COMPATIBILITY OF HUMAN BEINGS AND A HEALTHY FRAMEWORK

Studies have shown that free time activities are important in natural environments, such as gardens and parks, to help people handle stress and meet other non-stressful needs. This form of green elements increases the property's value and marketability. Be satisfied with the aesthetic needs of people from the nearby building looking down onto the green area. Psychosomatic research has shown that effect of the natural view holds the viewers' concentration, deprives them of their self-awareness, and thus improves health.

Patients were essentially assigned to the identical areas except for the view of the windows: one pair overlooked a small stand of leafy trees; the other had a view of a brown brick wall. Research on the recovery of patients with open-heart surgery in Sweden was carried out by Ulrich and Outi Lunde in 1990. The findings indicate that patients with water-open-views were less anxious after surgery than control groups or groups who were exposed to an abstract geometric image or an enclosed woods cape. Although there is still some factual evidence, these studies show the possibility of improving health by increasing the relationship between indoor and natural environments.

INDOOR ENERGY DESIGN IN BIOPHILIC ARCHITECTURE

Energy in the biophilic design must be used in various architectural functional areas, such as a cascade, for thermal areas. In the initial step, the energy distribution on buildings shall be reflected in passive biophilic architecture form and quantity, wherever the energy supply must match the function and, in these spaces, activity. This is important in terms of the thermal level spaces of architecture. The thermal hierarchy can be transformed into a plan of architecture. The interior spaces with the same temperature and internal contribution should be better assembled. Essential functional spaces should be better placed in the center of the architectural plan and spaces that are more temperate in the architectural plane periphery. This means that architects must avoid collectively placing room's at large temperatures. The maximal use of the natural convection in the interior of the building, for



energy transfer to the exterior, is necessary to create natural ventilation through airflows. This difference in temperature. By placing more warm areas in the structure can benefit from thermal stratification of the air.

Newly designed environmental buildings, thermal zoning is a vital element. The original architect, on the other hand, decided to configure the spaces in an existing building. The existing layout has to be adapted to determine which spaces are used. An enclosed area in which the air flows around is free and whose temperature is relatively consistent represents a thermal zone. In most cases, a separate zone would be any architectural space closed with the door. Temperatures can vary sometimes in various parts of large areas. In these cases, a number of smaller areas with annexing elements defined as voids can be divided into. This free flow of heat between the regions, but can be analyzed individually for their thermal characteristics.

For instance, we also like baths to be very warm, living rooms to be a comfortable temperature, and bedrooms to be modest, and we want different temperatures in different functional areas of the residential building. Well-organized passive biophilic architecture recognizes these differences and creates thermal zones for the functional areas of the various buildings. Thermal zoning tries to ensure the best possible match between architectural space distribution and the energy distribution available.

INDOOR ENERGY CHANGES AND MOVEMENT

Energy changes may also occur between indoor spaces. Energy can also change when doors are opened. Air change has been estimated at approximately 5m^3 per door opening and is calculated on 130 openings during the day for individuals in the habitat architectural program. An infiltration is an alternative form of energy change, in that energy from the building is lost in two ways: one through infiltration and the other through conduction. Wherever there are openings in the exterior envelope, air infiltration occurs.

Air pressure differences at the time permit too much air to enter or leave a building simply. Infiltration losses of around 38% of seasonal heat losses are possible in a well-insulated building. As a result, by bio-significantly lowering the infiltration rate, 90 percent solar heating is easily achievable. The issue is that infiltration is difficult to reduce to this level. The 1.5 air change per hour for standardized buildings is reduced by income from good weather conditions and by caulking building cracks to around 0.5 air changes per hour.

EFFECTS OF GREEN BUILDING ELEMENTS

Green elements are still frequently regarded by some "green people" as an undamaged aesthetic element in architecture. Green elements actually help to improve the microclimate in part by evaporation, filtering the air pollution, and reducing rooftop temperatures. The retention of rainwater is an important advantage in addition to improving the microclimate and the indoor climate. The most interesting ones are the summer cooling effect, the winter heat effect, and the increase in a lifetime in the green zone.

Green roofs have the following functions at different seasons: -

- In summer

The effect of cooling in the summer results in evaporating and 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 can significantly lower energy consumption in hot urban environments by enhancing the isolating properties of the waterproof layer. Because the plant leaf surface is evaporative, a major amount of radiation from the sun is applied to a green building element and the humidity in the plant is splashed. The larger the entire surface of the leaves, the larger the natural cooling effect. Though trees and shrubs offer better refrigeration than soil covers, more depths of the soil are also necessary and greater loads are imposed on the roof. Limitations in the structural 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 barely 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 about -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

This key pillar's principles are further subdivided into fourteen biophilic design sub patterns, where they have been extensively clarified in terms of the experience they generate, the origins of patterns, design characteristics, instances, and interactions with the other patterns, offering possibilities for integrated biophilic design strategies.

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

Nature in the Space

1. Visual Connection to Nature

- Improved mental engagement
- Considering health, it had very positively impact on human attitude.

2. Non-Visual Connection to Nature

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

3. Non-Rhythmic Sensory Stimuli

- Compliance and exploration measures observed and quantified
- Positively impacted on heart rate, nervous system and blood pressure

4. Thermal & Airflow Variability

- Impacted positively on well-being and comfort

5. Presence of Water

- Improved memory and attention restore, improved vision and psychological reaction
- Reduces stress, lower heart rate and blood pressure

6. Dynamic & Diffuse Light

- Increased visual comfort

7. Connection to Natural Systems

- Improved proactive health reactions and changed environmental awareness

Natural Analogues

8. Biomorphic Forms & Patterns

- This pattern provides comfort.

9. Material Connection to Nature

- Improved 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.
- Improved comfort level and reduces stress.

12. Refuge

- Improved concentration and attention



13. Mystery

- Generated strong 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 should be use from multiple angles.
- 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 micro-climate of the spaces, also to provide shade to the open interactive spaces.
- Strategic 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 shielding them from natural disasters and weather. City spaces in the streets with Particle Clear should have shelters 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 goal for planners is to translate these ideas and facts into living spaces. Since happiness is a public ideal, urban planners must approach the design of public spaces as restorative spaces as soon as possible.

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