International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Beyond Green: Exploring Experiential Spaces in Biophilic Design

Charu Tripathi[1], Dr. Parampreet Kaur[2], Ar Shrilekha Halder[3]

[1]Undergraduate Student, Amity University Chhattisgarh
[2]Associate Professor, Amity University Chhattisgarh
[3]Assistant Professor, Amity University Chhattisgarh

ABSTRACT
The pandemic revealed something what's been ignored for years: modern urban life has steadily pulled mankind away from nature. Researchers call this environmental generational amnesia,a gradual forgetting of what it genuinely feels like to breathe fresh air or hear leaves rustling around mankind. This research explores the connection between nature, biophilic experiences, and indoor built environments, examining practical approaches for people having these elements into the spaces that inhabit most. The study focuses on biophilic design not as simple decoration placing a few plants in corners but as a thoughtful strategy that creates real emotional and sensory experiences. It investigates spaces where nature becomes integral to the experience itself, engaging human senses, calming the mind, and encouraging people to stay longer .Through detailed case studies and empirical research, this work demonstrates how bringing nature indoors through light, water, textures, and living elements—can genuinely improve how people feel, work, and live. The results lend credence to architectural strategies that go beyond aesthetics, creating structures that actively assist mankind in rediscovering something that urbanization has gradually eroded from everyday existence.

KEYWORDS: Biophilic design, experiential architecture, indoor built environment, environmental generational amnesia, multi-sensory engagement.

1. INTRODUCTION

People have always belonged to nature long before concrete towers and glass facades. There's something about morning light filtering through leaves, or the sound of water trickling over stones, that just feels right. Yet most of mankind now spend nearly entire lives inside four walls, cut off from the very things that used to keep mankind grounded. Studies show people spend about 90% of their time indoors (Indoor Air Quality, 2022), disconnected from natural rhythms. Back in 1984, a biologist named Edward O. Wilson wrote about something he called biophilia basically, this idea that humans are hardwired to seek out nature (Kahn, 2002). It's not just poetic thinking; it's biology. Natural light lifts our mood. Plants calm mankind down. Even just looking at wood grain or hearing water can make mankind focus better. Stephen Kellert developed biophilic design, a valuable framework for bringing nature into architecture via materials, patterns, and spatial experiences. (kellert, 2008). Furthermore, the timing is ideal. According to study, natural environments can boost productivity and lower stress by up to 30%. People began to observe which locations depleted them and which made them feel better after being cooped up indoors for months during

COVID-19. Buildings that included nature into the experience itself, rather than just having a potted plant in the corner, felt nice.
The emphasis in this study is on people's experience, how space makes them feel and what they notice their mood shifts when surrounded by natural elements versus purely artificial ones .
In this study, people look at indoor enclosed spaces that people spend most of their life in such as offices, schools, hospitals, retail environments. It examines useful applications in urban settings, where reestablishing a connection with nature is perhaps most necessary but also most difficult.

2. LITERATURE REVIEW

Biophilic Design Theory

There's this idea that's been quietly shaping how people think about architecture biophilia. Edward O. Wilson, a biologist, wrote about it back in 1984 (Joye, 2007). He wasn't talking about design at all, actually. He was simply observing that humans seem to have this deep, almost automatic pull toward nature. People were drawn to it. They feel better around it. And when they cut off from it for too long, something feels off.Wilson called this biophilia literally, "love of life" and argued it's not just preference or nostalgia. It's hardwired into mankind (Kaplan, 1989). For thousands of years, people needed to be able to recognize patterns in nature to survive: where water is likely to run, what plants are safe and when storms approach. Those instincts didn't just vanish when cities were constructed. They're still with mankind, subtly affecting how they feel in certain spaces. People spend eight hours in fluorescent-lit offices and wonder why they're exhausted. Kids grow up in concrete playgrounds and never learn what dirt smells like after rain. They have created environments that our biology doesn't recognize as home.
Stephen Kellert's framework and Terrapin Bright Green's 14 Patterns of Biophilic Design serve as the two foundational rulebooks for creating such environments.
Both emphasises that nature can be introduced into buildings through three main categories:
Nature in the Space – the direct inclusion of living systems like plants, water, animals, and natural light.
Natural Analogues – elements that remind mankind of nature through materials, textures , colours , or biomorphic forms.
Nature of the Space – how spatial organization reflects natural environments, such as open views, mystery, and refuge.
Kellert's Five Core Principles:- Kellert goes beyond mere classification. He created five principles for biophilic design (Zelson):
Direct Experience of Nature: Direct interaction with living things, such as plants, water, and wildlife, has been shown to lower stress hormones and increase immunity**.. Indirect experience** encompasses natural materials, biomimetic designs, and images of nature that evoke similar responses. **Space and Place** focuses on creating logical spaces with organic spatial flow and gradual indoor-outdoor transitions. The book Evolved **Human-Nature Relationships** recognizes that people are naturally drawn to water and the prospect-refuge landscapes that have been shaped by evolutionary history. Finally**, Emotional Attachment** to Place acknowledges that biophilic and experiential design come together in meaningful spaces that create connections and memories. (kellert, 2008)

The 14 Patterns: Practical Application

Terrapin Bright Green took these ideas further, identifying 14 patterns that actually work in real buildings. Others are less evident, such as biomorphic forms that resemble natural shapes or non-rhythmic sensory stimuli (the unpredictable way nature changes), while others are straightforward, such as views of nature or water features. What matters is combining **living elements** like plants, natural ventilation, and changing daylight with **non-living elements** like wood, stone, and organic textures. Together, these produce multisensory experiences that appeal to sight, sound, touch, and even memory[13]. At that point, a space stops being merely decorated and starts to actually help people reconnect with nature. (Green.(2014))

3. METHODOLOGY

3.1 Research Design

This study has a qualitative dimension because numbers alone can't quantify what it's like to walk into a room filled with natural light, or how your mood changes when you hear water trickling nearby. The idea here is not to measure square footage of greenery or the number of plants — it's to get at the real human experience of being in spaces that are attuned to nature.Among other reasons, This also made sense to consider quality work because people all have different experiences of these spaces. What relaxes one person might invigorate another. What trips a memory in one person might pass another unnoticed. This study had to make space for those personal stories and perspectives. (Creswell)

3.2 Case Study Selection

Choosing which buildings to study wasn't random. Each case needed to demonstrate genuine biophilic design, not just a few plants scattered around. The criteria people had that all space had to actively integrate nature through multiple element water features, vegetation, natural light, materials that feel organic. It needed to show evidence of people actually interacting with these elements, not just walking past them. & there had to be documentation,either through site access, published research, or detailed visual records to properly analyze what was happening. (Groat)

3.3 Data Collection Methods

The Crest Avenues visit wasn't rushed. Time was spent simply watching where do people pause? Which corners feel naturally inviting? How does morning light differ from afternoon glow? These observations people have recorded. Informal discussions with employees provided more information than formal interviews could .Around 50 people filled out the survey, architecture students, working professionals, anyone spending serious time indoors.

International case studies video documentation turned out to be very valuable, in a way that was quite unexpected. The video is not only about visualizing the spaces. It is about people and how they interact with the spaces. It is about the people moving through them, where they are stopping, how light and sound are creating the atmosphere.

3.4 Survey Design

The purpose of the survey was to find out if people are aware of biophilic elements and how they impact their everyday lives. Around 50 respondents participated, representing different ages and professions, variety mattered because a 22-year-old architecture student might perceive spaces differently than a 45-year-old office worker.

3.5 Analysis Framework

Comparing cases from India and other countries brought to light how context influences biophilic design. What plants thrive indoors depends on the climate. Which aspects of nature most appeal to people depends on their culture. The scale of implementation is determined by the budget. These are design parameters, not barriers.

4. SURVEY&DATA COLLECTION

CASE STUDY & SURVEY: CREST AVENUE ,RAIPUR

The site visit to The Crest Avenues in Raipur an architecture by architect Pronith Nath from Urban Studio Mumbai.

Figure 1 : Front View
Source : Author

Figure 1 : Back View
Source : Author

The building is a fine example of experiential biophilic design through its lively terraces and sensory green spaces. The native trees such as Ficus benjamina and Areca palms help in creating vertical greenery whereas shrubs like Ixora and Duranta are used for the color and the texture. An intelligent drip-irrigation system, which is controlled by automated timers, waters one floor daily cycling through all five floors thus, the plants get exactly what they need. There are five workers who are solely responsible for the daily maintenance and they keep everything fresh and thriving. (Pallasmaa)

Figure 1 : Terrace Garden
Source : Author

Figure 1 : Corridor View
Source : Author

CASE STUDY: JEWEL CHANGI AIRPORT, SINGAPORE

Jewel Changi Airport doesn't feel like a typical airport terminal. Opened in 2019 after four years of construction, this $1.3 billion project by Safdie Architects deliberately blurs the line between transportation hub and nature sanctuary .The centerpiece ,a 40-meter indoor waterfall called the HSBC Rain Vortex—immediately catches attention. It's hard to miss, honestly. The sheer scale makes it the world's tallest indoor waterfall. What surrounds it matters just as much: the Shiseido Forest Valley contains over 2,000 trees and 100,000 shrubs, creating what genuinely feels like walking through a forest, not an airport. The ten-story building, five above ground, five below—means every level gives you a different angle on the waterfall. At night, coordinated light and sound shows turn it into something almost theatrical. Up on the top level, Canopy Park offers things you'd never expect at an airport: walking paths through fog, garden mazes, slides. People visiting often comment they completely forgot that they're in an airport. It's designed that way intentionally .Each terminal maintains its own gardens too. Terminal 1 has cacti and orchids. Terminal 2 grows sunflowers. Terminal 3 keeps live butterflies. Terminal 4 focuses on Singaporean heritage. Even the Skytrain connecting terminals passes through these green spaces, reinforcing that nature isn't decorative here, it's fundamental to how the whole airport functions. (changi)

CASE STUDY : THE GARDENS BY THE BAY IN SINGAPORE

1. Super-tree Groves: 18 futuristic vertical gardens, ranging in height from 25 to 50 meters, are located here. At night, when there are light and sound displays, these trees seem breathtakingly magnificent .A walkway that links to this clump of trees is the OCBC Skyway, which is 22 meters high and 128 meters long. Those who have been there will concur that they love the stunning views and that strolling along this walkway makes them feel very relaxed and at ease.
2. Cloud Forest: The 35-meter indoor waterfall is the first thing you see when you enter the Cloud Forest dome, and it is truly breathtaking. The instantaneous drop in temperature provides much-needed respite from Singapore's heat and resembles tropical mountain climates .The space houses rare orchids, heliconias, and carnivorous pitcher plants species you've typically only encountered in textbooks. Skywalks and elevators wind up Cloud Mountain, with pathways offering aerial perspectives into the canopy below. Every few hours, artificial mist releases, genuinely making you forget you're indoor.
3. The Gardens by the Bay's next most notable feature was the Flower Dome. The floral arrangement here changes with the seasons and features vibrant blooms and exotic tropical plants from many countries .The world's largest glass greenhouse is known as the Flower Dome .They have conserved a variety of flower and plant species from around the world, including Japan's Sakura , or cherry blossom. They've also planted Japanese cartoons to create a Japanese mood among the blooms.The temperature ranges from 20 to 25 degrees Celsus. Mud has a strong aroma that is pleasing to the senses. (gardens, n.d.)

CASE STUDY : CARP CAFÉ, CHIANG MAI, THAILAND

If a koi pond and a rain forest had a child, the result would be Carp Cafe, a Chiang Mai, Thailand café.

Instead of sitting by the koi pond, you sit inside it.Sunken tables allow you to eat inside whileviewing be autiful koi swimming all around you.They are colorful and gorgeous, and you may feed them as you dine and watch them swim by like floating works of art.

It's like dining in a living picture.This cafe offers a really peaceful vibe.You are surrounded by water, grass, and the most relaxing ambient sounds.There are even some koi fish in the restroom. You can even explore rainforest routes reminiscent of Studio Ghibli films, complete with hidden books and tiny ponds. (Architects.)

CASE STUDY : PENANG HILL BIOSPHERE RESERVE, MALAYSIA

Penang Hill works differently than the other cases. It's a UNESCO Biosphere Reserve where the architecture doesn't try to compete with nature it just helps you experience what's already there. The funicular railway climbs at about 52% gradient, steep enough that you notice the elevation change quickly. The Langur Way Canopy Walk is the real highlight a suspended walkway through actual forest. Walking across it, you're genuinely up in the tree canopy with filtered sunlight coming through leaves and dense greenery everywhere you look. It's quiet up there. Almost surprisingly quiet for a tourist spot. What's interesting about Penang Hill is how simple the approach is. They built trails and viewing platforms without clearing much forest. Wildlife still moves through freely. You might spot monkeys or birds just going about their business while people walk nearby. It proves something important: biophilic design isn't always about bringing nature inside buildings. Sometimes it's just about getting people outside more thoughtfully. (penang hills)

6. DISCUSSION AND OVERALL ANALYSIS

Looking at these projects together—Jewel Changi, Gardens by the Bay, Penang Hill, Carp Café, and Crest Avenue—what becomes clear is how differently each tackles the same fundamental challenge: reconnecting people with nature in built environments.

Jewel Changi goes big. That Rain Vortex is impossible to ignore, using drama and scale to pull travelers into an experience they have not expected. Gardens by the Bay does something similar but educational—recreating entire climate zones indoors so visitors can literally walk between ecosystems. Both rely on spectacle, and honestly, it works. People stop, look, engage. Biophilic design doesn't have to be ostentatious, as these subtler interventions demonstrate .In the middle is Crest Avenue, where smart systems maintain the workplace greenery, integrating nature into everyday life rather than treating it as a unique destination. The filtered light and plant scents in those hallways have an unconscious effect on you. This is more important after the pandemic. People discovered which areas felt stifling versus restorative after spending months indoors. These initiatives address that change, but there are still gaps many prioritize visual greenery at the expense of sound, smell, and thermal comfort .Nevertheless, there is proof that carefully incorporated nature actually alters how people perceive buildings.

7. CONCLUSION

The research revealed patterns that honestly surprised in their consistency. Jewel Changi's dramatic Rain Vortex serves thousands daily, while Crest Avenue's planted terraces create comfortable workspaces in Raipur, yet both succeed. Climate, budget, and culture shape how you implement things, obviously, but the core idea holds: humans need nature. Second, distinguishing between living and non-living elements matters more than expected. Plants, water, natural ventilation, these create dynamic connections that change throughout the day. They need maintenance, which itself becomes part of the relationship. Meanwhile, wood textures, stone surfaces, organic forms trigger responses you don't consciously notice. Third, experience beats aesthetics every time. Some spaces looked beautiful in photos but felt flat in person when sensory depth was missing. The reason Carp Café was successful was because it mankinded all five senses at once, sight, sound, smell, and touch to create immersion rather than just pleasant views.. At last, priorities actually changed after the pandemic. Nowadays, efficiency is just as important as health and well-being (Post pandemic wellbeing).People want to know if buildings make them feel good, not just if they save energy.

Limitations

There was little investigation into residential buildings in this study; it was mainly concerned with public and commercial structures. Tropical and subtropical environments were the main focus of the geographic scope.

8. FUTURE SCOPE

Post-COVID Indoor Lifestyles probably changed how people think about indoor spaces permanently. Remote work normalized homes functioning as offices, gyms, schools, and social spaces simultaneously, raising questions about biophilic design when boundaries blur this much. What does it look like in residential contexts where people spend 90% of their time? How do apartment dwellers without balconies or yards actually benefit[2]? Beyond passive features, next-generation buildings should incorporate actively **multisensory experiences**, such as gradually brightening morning light, changing soundscapes throughout the day, and seasonal variations in air quality. By using adaptive facades and responsive irrigation, **smart systems** could strike a balance between wellbeing and efficiency. When physical access is limited, virtual nature has the potential to reduce stress. As cities get denser and climate issues worsen, biophilic design is becoming a necessity rather than luxury. (Journal of urban management)

References

1. Architects., (. I. (n.d.). carp cafe project,thailand.
2. changi . (n.d.). *https://youtu.be/wtYua0tfq-8?si=hcMtPoAQSM1RIU_8*.
3. Creswell, J. W. (n.d.). shoosing among 5 approaches.
4. *gardens*. (n.d.). Retrieved from https://youtu.be/YGFNDTSkyOI?si=oBOn74-75-8Kca5W.
5. Green.(2014), T. B. (n.d.). patterns of biophilic design.
6. Groat, 2. (n.d.). architectural research method.
7. Indoor Air Quality. (2022). *Environmental Protection Agency (EPA).*, 10.
8. Journal of urban management. (n.d.). *https://doi.org/10.1016/j.jum.2021.01.002*.
9. Joye, Y. (. (2007). case of biophilic architecture. *environmental psychology*.
10. Kahn, P. H. (2002). Envirnonmental generational amenesia. *children and nature*.
11. Kaplan, S. (. (1989). experience of nature. *cambridge university press*.
12. kellert. (2008). biophilic design. *practise of bringing buildings to life*.
13. Pallasmaa, J. (. (n.d.). architectre and senses.
14. penang hills. (n.d.). *https://youtu.be/wtYua0tfq-8?si=vNMk7_JwLCuMlxmE*.
15. Post pandemic wellbeing. (n.d.). *https://doi.org/10.1038/d41586-020-03553-7*.
16. Zelson, M. (. (n.d.). stresss recovery. *journal environmental psychology*.