Biophilic Design: Implementation & Outcomes

BEYOND SUSTAINABILITY – BIOPHILIC AND REGENERATIVE DESIGN IN ARCHITECTURE

Bruno Duarte Dias
European Scientific Journal March 2015
Note: Stephen R Kellert, 6 elements, 75 attributes

Biophilic Design:
1. Environmental features
2. Natural shapes and forms
3. Natural patterns and processes
4. Light and space
5. Place-based connections
6. Evolved human relationship to nature

Living System thinking
Charles Krone. Living system thinking sees what they are working on as a system of energies or life processes, rather than as things or as a system of things

1. Existence - concentrate on what is there
2. Operate - improve the efficiency
3. Maintain - focus on resilience
4. Potential - what existed but not yet manifested
5. Improve - restorative level
6. Regenerate - goes beyond improving current systematic performance

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Heerwagen & Hase

Characteristics of Biophilic Design
2001

Enticement
-Information richness that encourages exploration, discovered complexity
-Visual distance, horizontal / sky imagery, strategic viewing conditions
-Canopy effect, enclosing surfaces, penetrable barriers and surfaces for views out
-Sense of playfulness

Biomimicry
-Fractal characteristics
-Designs derived from nature
-Use of natural patterns & forms

Water
-Glimmer or reflective surface
-Moving water
-Symbolic form of water

Biodiversity
-Outdoor natural areas with rich vegetations and animals
-Varied vegetation indoors and out
-Biodiversity: windows designed and placed to incorporate views

Sensory variability
-Natural rhythm and processes
-Changes and variability in environmental colors, air movement, light, temperature and texture over time and space

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Biophilia in Practice: Buildings that Connect People with Nature

Alex Wilson,
Building Green, 2006,

General
1. Addressing biophilia early in the design and planning process
2. Address biophilic design with all buildings, but especially those for children, elderly, and the infirm
3. Integrated teaching of ecology into building
4. Seek ways to integrate biophilic Design into existing as well as new building
5. Help get the message out
6. Design landscape and buildings for a sense of mystery
7. Foster attachment to place

Site Design
1. Provide open space around building
2. Maintain exiting trees and native landscape
3. Building pathways though naturalized and landscape areas
4. Replace impervious landscape surfaces with diverse native plantings
5. Provide living walls on building exteriors

Building Design
1. Provide views to nature
2. Blur the transition between interior and exterior space
3. Avoid interference with key sight lines
4. Provide high levels of daylighting
5. Provide operable windows
6. Provide green roofs
7. Incorporate vegetated atria and interior planting beds
8. Consider Incorporating living walls and other living systems for air and water purification in building
9. Consider incorporating water features in buildings
10. Create sense of complexity-yet oder
11. Address both spaciousness and refuge in building design
12. Incorporate organic forms into buildings

Interior Design
1. Decorate with potted plants
2. Provide natural materials and nature art in buildings
3. Configure office spaces to enhance views of nature
4. Provide Interpretation as part of the interior design"

WELL V2 Standards

It has seven health categories: air, water, nourishment, light, fitness, comfort, and mind. Registration for WELL costs $1,500 to $10,000, certification is $4,000 plus a square footage cost of $0.08 to $0.23 per square foot depending on project type and size. Performance costs $9,000 with a square footage cost of $0.15 to $.35 per square foot.

Biophilia 1 qualitative

1. Nature incorporation
-Environmental elements
-Lightning
-Space layout

2. Pattern incorporation
-Nature's patterns through the design

3. Nature interaction
- Within the building
-Within the project boundary, external to the building

Biophilia 2 quantitative

1. Outdoor biophilia
-Features either landscaped grounds or rooftop garden accessible to building occupants
-Consists of, at minimum, 70% planting including tree canopies (within the 25%)

2. Indoor biophilia
-Potted plants or planted beds cover at least 1% of floor area per floor.
- A plant wall per floor, covering a wall area equal or greater than 2% of the floor area, or covering the largest of the available walls, whichever is greater.

3. Water feature
- At least 1.8 m [5.8 to 6 ft] in height or 4 m² [43 ft²] in area.
- Ultraviolet sanitation or other technology to address water safety

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Fitwell

U.S Center for Disease Control and Prevention, General Services Administration

Fitwel has twelve sections: location, building access, outdoor spaces, entrances and ground floor, stairwells, indoor environment, workspaces, shared spaces, water supply, cafeterias and prepared food retail, vending machines and snack bars, and emergency procedures. Registration costs $500 and certification costs $6,000.

Impacts Surrounding Community Health
Strategies that impact surrounding community health broaden the impact of the project past the health of on site occupants, reaching those who live, work, play, or learn in neighboring areas

Reduces Morbidity and Absenteeism
Strategies that reduce morbidity and absenteeism promote decreased rates of chronic disease and mental health conditions, reductions in disease transmission,and fewer missed days of work.

Supports Social Equity for Vulnerable Populations
Strategies that support social equity for vulnerable populations ensure thata range of populations, including children, elderly, disabled, or socio-economically disadvantaged persons have increased access to health-promoting opportunities whether through universal accessibility, pricing incentives, targeted amenities, or pedestrian-focused environments.

Instills Feelings of Well-Being
Strategies that instill feelings of well-being promote inclusion, relaxation, and perceptions of safety, through rejuvenating and clean spaces, an enhanced connection to nature, and opportunities for social engagement.

Enhances Access to Healthy Foods
Strategies that enhance access to healthy foods provide occupants with expanded availability to fruits, vegetables, and other nutritious food options by diversifying the outlets and sources of healthier food options, promoting healthier choices,and reducing cost of healthier options through pricing incentives.

Promotes Occupant Safety
Strategies that promote occupant safety decrease risk of crime and injury, protect bicyclists and pedestrians from vehicular traffic, and increase stair safety.

Increases Physical Activity - Strategies that increase physical activity incorporate opportunities for movement into everyday life whether through encouraging active transportation, promoting stair use, or expanding access to indoor and outdoor fitness areas and equipment.

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https://drive.google.com/file/d/1kdh1_Q5UgQ62Pcy2UGm94JQEQJ8nuuqo/view

https://www.buildinggreen.com/feature/biophilia-practice-buildings-connect-people-nature

https://v2.wellcertified.com/v/en/overview

https://www.fitwel.org/standard