International Journal of Architecture and Urbanism Vol. 09, No. 03 (2025) 510 – 518

talenta PUBLISHER

International Journal of Architecture and Urbanism

Journal homepage: https://talenta.usu.ac.id/ijau

Integrating Biophilic Design into Multifunction Space in Shipping Container for Sustainable Living

Yunida Sofiana*[1], Titi Indahyani[1], Hervina Dyah Aprilia[1]

[1] *School of Design, Interior Design Department, Binus University, Jakarta, Indonesia*

*Corresponding Author: yunida@binus.ac.id

ARTICLE INFO

Article history:
Received 21-06-2024
Revised 01-10-2025
Accepted 28-10-2025
Available online 18-11-2025

E-ISSN: 2622-1640
P-ISSN: 2622-0008

How to cite:
Sofiana Y, Indahyani T, and Aprilia H. D. Integrating Biophilic Design into Multifunction Space in Shipping Container for Sustainable Living. International Journal of Architecture and Urbanism. 2025. 9(3): 510-518.

http://doi.org 10.32734/ijau.v9i3.23590

ABSTRACT

The innovative use of shipping containers as multifunctional spaces, including residences, retail shops, and offices, has gained attention as a flexible and practical solution for urban environments. This study explores the potential of transforming shipping containers into adaptable spaces—designated for Staycation, SOHO (Small Office Home Office), and MSME Gallery—to meet the evolving needs of urban communities in the post-pandemic era. By incorporating biophilic design principles, the project aims to enhance the comfort and well-being of users, fostering a connection with nature in compact urban settings. A descriptive qualitative research methodology was employed, combining literature review and field observation, followed by analysis through design thinking. The outcomes of this research contribute to the promotion of sustainable living practices by demonstrating how repurposed shipping containers can serve as multifunctional, eco-friendly spaces that support both personal and business needs in urban areas during challenging times.

Keywords: biophilic, containers, multifunctional, shipping, space

1. Introduction

Shipping containers have found diverse applications across the globe, extending far beyond their original purpose of transporting goods. Today, they serve as homes, cafes, offices, and more. Traditionally, these containers have been primarily used for short-term housing, such as emergency shelters or mobile residences. Compared to conventional buildings made of brick or concrete, shipping containers offer several advantages: they have a smaller environmental footprint, require less time to assemble, and provide mobility, which is useful when relocating or expanding structures. During the pandemic, these benefits were particularly relevant, with shipping containers being repurposed for retail spaces, small offices, staycations, and emergency isolation rooms. This practice of repurposing shipping containers contributes to sustainability, as most of the materials used are recycled, showcasing the mobility, cost-effectiveness, and eco-friendliness of shipping container-based construction [1][2].

To maximize the benefits of shipping containers, this paper explores the process of designing multifunctional interiors for these structures. The multifunctional spaces are categorized into three key uses: (1) staycation or self-isolation units for COVID-19 patients, (2) small offices or home offices, and (3) retail spaces or galleries for MSMEs. These categories are relevant to post-pandemic spatial dynamics, where it is anticipated that the spatial needs for homes and workplaces will evolve due to physical distancing measures and increased

digitalization of daily activities. This shift is likely to transform how residential and workplace environments are structured, requiring adaptation to new norms and demands [3].

While shipping containers are a viable option for these purposes, their aesthetic appeal is generally lower than that of conventional building materials, necessitating modifications to meet human needs and integrate better with their surroundings. Furthermore, shipping containers, being locally responsive, provide flexible solutions to specific urban needs, such as retail spaces or small offices. The rapid growth of cities, coupled with industrialization and population increase, exacerbates environmental challenges, including global warming. In this context, designers must seek sustainable solutions for the future. Biophilic design, which reconnects humans with nature, offers a promising approach to enhancing the well-being of occupants while integrating the interior with the environment. Implementing biophilic design in shipping containers, particularly during the pandemic, can foster healthier urban spaces [4][5].

2. Method

This paper employs the Design Thinking Process (Figure 1) as the methodological framework to address the design challenges of creating multifunctional spaces within shipping containers. The Design Thinking approach, developed by the Hasso-Plattner Institute of Design at Stanford, consists of five key stages: empathize, define, ideate, prototype, and test [6]. The process begins with the Empathize phase, where data is gathered through field observations to understand the users' needs and challenges. This stage aims to identify the target users and their specific requirements for multifunctional space. Following this, the Define phase seeks to pinpoint the core problem or design issue based on insights from the empathizing phase. This step clarifies the goals and objectives for the design.

In the Ideate phase, creative solutions are developed to address the users' needs by merging biophilic design principles with the multifunctional use of shipping containers. This stage encourages brainstorming and the exploration of multiple possibilities for the interior design. The next step, Prototype, involves creating physical models or 3D representations of the design to visualize how the final product might look and function. These prototypes are used to engage with users, allowing them to interact with the design and provide early feedback. Lastly, the Test phase involves evaluating the prototypes with users to gather feedback, which is then used to refine the design further. Throughout this iterative process, data collected from literature reviews on sustainable design, shipping containers, biophilic design, and urban living are analyzed to guide the creation of a sustainable and comfortable living environment. Design Thinking is applied to analyze user data and guide the development of shipping container designs that integrate biophilic principles to enhance the quality of life.

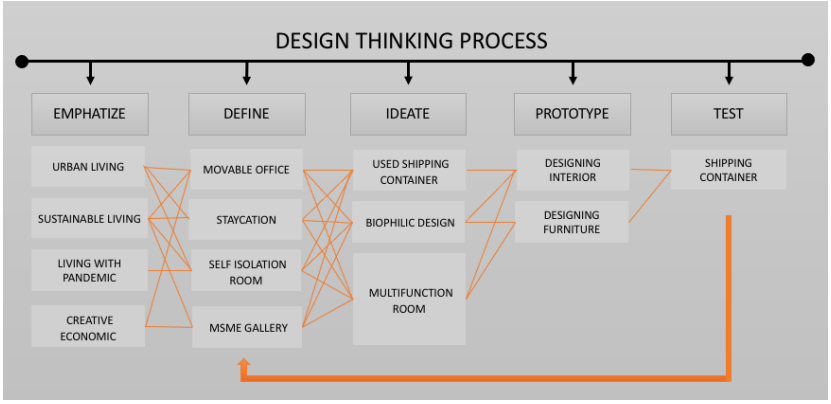

Figure 1. Design thinking process

3. Result and Discussion

Feasibility Shipping Container

A shipping container is a durable steel structure, typically cuboid in shape, designed to withstand the demands of transporting and storing heavy goods. Containers come in various types, ranging from refillable units to

those standardized for global trade. The term "container" has become synonymous with a transport unit that can be easily transferred across vehicles without requiring the contents to be unloaded. However, when repurposing these containers for construction, it is essential to reassess their strength based on different configurations and real-world loading conditions. For architectural applications, engineers often use finite element analysis (FEA) software to model and ensure the containers' ability to endure structural demands [7] (Figure 2).

In preparation for construction, local contractors must ensure that equipment such as cranes and forklifts are available to lift the containers safely. Factors such as the vehicle's capacity, traffic patterns, and road conditions need to be considered when transporting containers from their point of origin to their final destination. Furthermore, the recyclable value of the containers is an important consideration, as it could offset the cost of repurposing. This highlights the long-term economic advantages of transitioning to container-based residences, particularly since many containers are underutilized, with over 20 million containers left abandoned globally at any given moment [8]. Each shipping container is composed of six structural planes: four sides, a floor, and a roof. These planes are reinforced with steel posts and corner supports, ensuring that the container can withstand the stresses encountered during transportation. This structural integrity, combined with the use of recycled materials, makes shipping containers a sustainable building option, helping reduce the embodied energy and carbon emissions typically associated with traditional construction methods [8].

Additionally, the modular nature of shipping containers (Table 1) makes them an ideal candidate for a variety of architectural uses [9]. Despite their standardized shape, they can be easily adapted into diverse functional spaces, from compact residential units to larger facilities such as offices, retail spaces, or even cultural centers. This flexibility makes container-based construction both cost-effective and time-efficient, especially in urban areas where space is limited. The adaptability of containers also allows them to be relocated or modified for future needs, providing additional flexibility for urban development [10].

Table 1. Feasibility shipping container

Feasibility Shipping Container	Economic	Construction	Design
Access air and light		v	v
Strength of container	v	v	
Heat insulation & soundproof		v	v
Flexibility	v		v
Modular unit	v	v	v
Decorated & furnished			v

Figure 2. Container 20 feet (6,1x2,44x2,59 m) [7]

Biophilic Design

Incorporating nature into a space extends beyond simply adding plants; it involves integrating various natural elements such as sustainable materials, nature-inspired imagery, and natural systems into the design. Biophilic design aims to create environments that allow individuals to connect with nature, using multiple sensory experiences. These experiences can be direct, indirect, or integrated into the design of the space. The core of

biophilic design is to enable individuals to engage with nature in their daily environments through their senses, whether by sight, sound, touch, smell, or even taste [11]. In addition to interacting with the space, biophilic design also considers how the materials chosen impact human well-being, ensuring that these materials are not only aesthetically pleasing but also safe for use.

Research has highlighted the importance of nature for urban populations, with studies indicating that proximity to natural environments is particularly beneficial for city dwellers. The lack of natural elements in urban spaces is linked to higher rates of certain health issues compared to rural populations [12]. Both natural and artificial environments are known to reduce stress, but natural settings tend to have a significantly stronger effect [13]. Engaging directly with nature has been shown to enhance cognitive performance [14]. Furthermore, indirect interactions, such as exposure to nature videos or even nature imagery, have been found to boost alertness, improve memory, and provide mental refreshment [15]. Studies have even shown that brief visual exposure to nature can reduce blood pressure and improve overall health [16][17].

As more research emerges, it is becoming increasingly clear that people's physical and mental health is closely tied to their connection with the natural world, making such experiences essential rather than just a luxury [18][19]. With many individuals spending most of their time indoors, direct contact with nature is often limited, yet biophilic design can bridge this gap by creating indoor environments that promote well-being. Kellert [19] identified six core elements of biophilic design: (1) environmental features, (2) natural forms and shapes, (3) natural processes and patterns, (4) space and light, (5) geographic connections, and (6) the evolving relationship between humans and nature.

Table 2. Biophilic attribute to shipping container

Biophilic attribute	Floor	Wall	Ceiling	Furniture	Accessories
Environmental Characteristic	v	v	v	v	v
Natural Form & Shapes	v	v		v	v
Natural Processes & Pattern	v	v			
Space & Light	v	v	v		
Relationship on Geography				v	v
Human Nature Relationship				v	v

Table 2 highlights the specific attributes of biophilic design that can be incorporated into the structure and interior design of shipping containers. These attributes focus on enhancing the connection between the occupants and the natural environment, creating a more harmonious and sustainable living space. The table categorizes biophilic design elements by the types of surfaces (floor, wall, ceiling, furniture, and accessories) within the shipping container. For example, incorporating environmental characteristics such as natural lighting, ventilation, and materials that mimic natural textures can foster a healthier and more pleasant atmosphere. Additionally, using natural forms and shapes in the design of the space, such as curved lines or organic materials, can help evoke a sense of calm and comfort [19].

The integration of natural processes and patterns is also key to fostering a deeper connection with nature. This could involve mimicking the natural rhythms of day and night through lighting design or the use of soundscapes that reflect outdoor environments. Space and light elements, such as large windows or openings to allow natural light, also play a significant role in improving the occupant's well-being [19]. By focusing on these biophilic attributes (Table 2), shipping containers can be transformed into more than just functional spaces—they become environments that nurture the physical and mental health of the occupants, promoting a balanced and restorative living experience.

Multifunction Design Concept

This multi-function design concept from a shipping container is named "BEE LIC". The name BEE LIC is inspired by the Indonesian word "Bilk" (bi lik), which has the meaning of a small and insulated room. The

word “Br” is pronounced like Bee. Bee is Binus University’s strong iconic character and identity. While the word “LIC” will strongly remind us of the Biophilic approach.

BEELIC is a compact and multi-function interior and furniture design for small living and MSME’s retail business activities, which use the shipping container to support sustainable living and environment preservation. In this multi-function design concept, the shipping container transformed into a comfortable living for daily activities such as staycation, self-isolation (ISOMAN) for covid patients, small business office work (SOHO), and MSMEs’ Mini Gallery Showcase. BEELIC applies a biophilic approach to create an interior atmosphere that is more natural, calming, relaxing, inspiring, and motivating, supporting a healing environment and recovery, but could also allow the occupant to concentrate during daily routine activities while working fully. The BEELIC concept is planned to be utilized both during and after the pandemic period as a compact, flexible and multi-functional spatial arrangement.

These shipping container design adjustments are based on the fact that the stay-at-home order's issuing, along with the shutting of businesses, schools, restaurants, and other establishments, constituted the best way to stop severe and ongoing harm to the public's health. As a result, the unique circumstances brought on by the pandemic are seen as a chance to consider how adaptable shipping containers are and how well multi-function Design can meet the changing needs of the urban users. These reflections can lead to a set of valuable suggestions for how to fulfil the space's potential and prepare it for life after COVID-19. The implementation of the design concept on the container is designed as follows: (a) Interior, furniture and interior accessories adjusted to room size; (b) Multi-functional room; (c) Multifunctional furniture; (d) Storage optimization for small areas; (f) Biophilic Design approaches is considered to support the comfort of the occupants.

This Shipping container design is the initial project of a small space in an urban area (urban living) that can facilitate people's lives, especially young people in a crowded environment. This small space is made with a modern concept with a compact furniture system that can facilitate daily activities such as sleeping, bathing, cooking, resting, studying or working in a limited-sized multifunctional area. The concept of a small space in a container has user characteristics that are almost the same as a small house, which is intended for a single user (single user). And the COVIT information centre, as a residence (staycation/homestay), work area (small office home office = SOHO) and a means of promotion and marketing of MSME products (gallery).

In space programs with limited land, the function of each space cannot be separated as in conventional housing. However, the grouping of tasks that have close relationships can be placed in one area so that there is suitable space efficiency in the area. This small space divides each function space into several places, starting from the bedroom, living area-bathroom, kitchen, and dining area. The placement of the living room is at the end of the house. In that area, there are many activities, such as resting, watching tv, working, studying and the living room area is the main area in designing a small space. After the living room area, there is a kitchen area and a dining area, the living room area and the kitchen area are indeed close, but have a partition, namely, there is a cupboard as the living room area gets its privacy. The dining area is directly opposite the kitchen area, so that the distance between the kitchen and the dining area is not far, the dining area itself is designed like a bar table and stool. After the kitchen area, there is a bathroom area used for small-sized cleaning activities, in which there is a toilet area, shower box and sink area.

Circulation in the Design of this shipping container uses furniture that is multifunctional or has multiple uses, and also uses furniture that has a smaller size compared to its original size (Table 3). It is intended to expand the circulation area of the house. This small space also uses several large glass parts and neutral colours to give the impression that the room is not cramped, even though it is a small space. However, in a shipping container, the spaces will be designed as follows: (1) They are adapted to the size of the room; (2) Multi-functional furniture. That way, the amount of furniture needed to meet user needs can be reduced and save more space; (3) For storage, it will maximize small areas that can be converted; (4) In one room has several functions, and activities for the needs of the house’s occupants; (5) In a furniture design, it has multiple functions (not only one function); (6) The colour arrangement that gives the occupants physical and psychological effects; (7) Space programming: the room is divided into a semi-private area and a private area.

Table 3. Design application on shipping container

Design elements	Application on Design
Floor	use a frame made of wood which will then be covered with a layer of used pine wood & given a varnish finish which will provide a more attractive colour to the pine wood.
Wall	walls using environmentally friendly materials with room insulation which is then covered with pine wood pallets as the outer wall finishing
Ceiling	the ceiling will be designed with an open top so that it directly shows the roof framework of the building and it gives the impression of being broad and open.
Lighting	the lighting system will use two lighting systems based on the source: natural lighting (using sunlight) and artificial lighting (lamps). This beelic use a wide window in front of the shipping container wall that allows good circulation of light into the space to reduce the use of artificial light during the day.
Acoustic	Acoustic materials will use dry leaf processing of organic waste in urban areas. The dry leaf board was created as a panel, with the primary considerations being flexibility in capabilities and ease of use. The initial purpose of its production is as a building material that is easy to maintain. So far, the dry leaf board thickness is still in the 18 mm range. Dry leaf board material has an excellent acoustic ability for speech rooms with low-mid frequency characters.
Color	The colours used are neutral colours such as white, grey, and brown, which are earth tone colours that will give a natural and comfortable impression for users and give a spacious illusion. These colours were also chosen because the concept chosen to be applied to the interior Design of this house is minimalist-natural.
Material	Most of the materials used are environmentally friendly and recycled materials that can reduce the problem of waste in the environment. Using used pine wood material for the walls and floor will create a comfortable impression.
Furniture	Multifunctional furniture aims to be able to meet the daily activity needs of the users in a limited space. Multifunctional furniture has more value by combining two or more functions into one piece of furniture. Therefore, multifunctional furniture has more value in terms of ergonomics and economic space.
Design concept	This design concept created simple modern to meet the needs of limited space but still be able to adapted the user's needs. The design concept accommodated this space as a self-isolation facility (ISOMAN) or staycation, as a working space (SOHO), and finally, as a gallery of MSME.

The simple modern interior Design refers to simple buildings, minimalist designs, choosing neutral and monochromatic colours, not having complex patterns or motifs, and using natural materials such as stone, wood, and leather, which are sometimes combined with solid materials such as metal, glass, and steel. The modern design emphasizes the simple impression in every element, including the furniture and decorations. A sustainable development system or sustainable construction is a solution that can be done, covers many aspects of the implementation of development, uses environmentally friendly materials, and is easy to maintain by using materials from used/recycled materials so that they participate in reducing waste and help keep logging. With various intended functions, this small space carries a simple and functional modern concept that makes it easy for a residence to turn into the tasks mentioned above.

The multifunctional design for shipping containers, as outlined in Table 4, demonstrates how these versatile structures can meet the diverse and evolving needs of modern urban spaces. With increasing urbanization and a growing demand for flexible, cost-effective, and sustainable living solutions, shipping containers have emerged as a viable alternative. The table categorizes the multifunctional use of shipping containers into three key purposes: Staycation & Self-isolation, SOHO (Small Office Home Office), and MSME Gallery, each addressing distinct user needs and spatial requirements.

The design for Staycation & Self-isolation prioritizes creating a private, comfortable retreat, ideal for individuals seeking temporary isolation or a break from the urban environment. The design features wide windows and glass doors that ensure ample natural light and airflow, enhancing the overall living experience within a compact space. The open space layout promotes simplicity and ease of movement, while

multifunctional furniture—such as foldable beds and hidden storage solutions—maximizes the use of limited space. This design provides an affordable and efficient space for both temporary living and isolation purposes, offering privacy and comfort without excessive spatial requirements.

In the SOHO (Small Office Home Office) design, the focus is on creating a flexible and productive workspace within the shipping container. As remote work becomes increasingly common, this design addresses the need for a quiet, functional home office. It incorporates ergonomic furniture, modular storage units, and designated work areas to separate personal and professional spaces within the same unit. Large windows are included to allow natural light to flood the interior, enhancing productivity and reducing the need for artificial lighting. Soundproofing and heat insulation are also key elements, ensuring that external distractions and temperature fluctuations do not interfere with the work environment. This design serves as a practical solution for remote workers, combining functionality with comfort.

The MSME Gallery design is tailored to meet the needs of small and medium-sized businesses by offering a flexible, modular retail space. The design maximizes the container's potential as a temporary or permanent venue for showcasing products or services. Wide glass windows and doors create an inviting façade, encouraging foot traffic while allowing natural light to illuminate the interior. The layout of the gallery includes adjustable display units and shelving systems that can be easily rearranged depending on the business's needs, ensuring a dynamic and versatile retail environment. This flexible setup makes it an ideal solution for pop-up shops, small exhibitions, or mobile businesses, providing an affordable and scalable space for entrepreneurs looking to establish a presence in urban areas without the burden of high rent or overhead costs.

Overall, the multifunctional design of shipping containers, as detailed in Table 4, highlights the adaptability and sustainability of these structures in addressing diverse urban needs. By incorporating features like natural light, space-saving furniture, modular layouts, and biophilic elements, these designs optimize the use of space while maintaining a comfortable and functional environment for users. Whether serving as a temporary living space, home office, or business gallery, shipping containers offer a cost-effective and flexible solution to the challenges of modern urban living. The use of shipping containers in multifunctional design is a step toward more resilient, resource-efficient, and adaptable urban spaces that meet the growing demand for sustainable, compact, and affordable living solutions.

Table 4. Multifunction design for shipping container

Description	Staycation & Self isolation	SOHO	MSME gallery
Exterior Design: wide window+glass door for air & sunlight			
Layout Design: Simple and clean space for user circulation & activities			
Interior Design: multi-function furniture design in back wall cabinet	 		

4. Conclusion

The potential of using shipping containers as multifunctional spaces offers a significant opportunity for the future of urban living. These containers, when thoughtfully designed, can become efficient and sustainable alternatives to traditional buildings. However, it is important to evaluate them from the perspective of user experience, especially considering how limited space can impact daily activities. To ensure comfort and functionality, the design concept must focus on compact, multifunctional layouts that arrange furniture and design elements strategically to support various activities within confined spaces. Incorporating a biophilic design approach into shipping containers further enhances the quality of life for the occupants by improving the interior ambiance, making the space not only more comfortable but also healthier and safer. The integration of nature-inspired elements—through materials, light, and natural systems—creates a space that promotes well-being. This approach can be particularly beneficial during challenging times, such as pandemics, providing flexible spaces for self-isolation, work, and leisure. Additionally, this design concept is highly adaptable for MSMEs that face limitations regarding space, marketing, and funding, offering them the flexibility to operate in different locations with low overhead costs. Ultimately, the use of shipping containers as multifunctional spaces could serve as a valuable solution to urban challenges, offering an adaptable, sustainable, and cost-effective alternative for a wide range of urban activities.

5. Acknowledgments

This research was supported by Bina Nusantara University Internal Grant 2021 for the School of Design, Interior Design Department.

6. Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper. All findings and interpretations in this research are unbiased and represent the results of independent academic inquiry.

References

[1] M. Buchmeier, H. Slawik and S. BJ. Tinney. *Container Atlas: A practical guide to container architecture*. (Gestalten Verlak, Berlin, 2010).
[2] M. Martinez-Garcia, Alternative Housing: The Shipping Container Home. Natl Assoc Realt, 1–3 (2014).
[3] A. M. Salama, Coronavirus questions that will not go away: interrogating urban and socio-spatial implications of COVID-19 measures. Emerald Open Res. 2:14 (2020).
[4] S. Caan, *Rethinking Design and Interiors: Human Beings in the Built Environment* (Laurence King, 2011).
[5] S. R. Kellert and E. O. Wilson, *The Biophilia Hypothesis* (Island Press, Washington DC, 1993).
[6] R. F. Dam and T. Y. Siang, 5 Stages in the Design Thinking Process [Internet]. Interaction Design Foundation. 2017 [cited 2021 Jun 11]. Available from: https://www.interaction-design.org/literature/article/5-stages-in-the- design-thinking-process.
[7] Port Shipping Logistics [Internet]. 2 June 2012. [cited 2021 Jun 20]. Available from: http://portsandshipping.blogspot.com/2012/06/twenty-foot-equivalent-unit.html
[8] Z. Sun and H. N. R. Mei, Overview of Modular Design Strategy of the Shipping Container Architecture in Cold Regions. In: IOP Conference Series: Earth and Environmental Science. 2017.
[9] J.A. Pena and S. Kurt, Design of Reusable Emergency Relief Housing Units Using General-Purpose (GP) Shipping Containers. Int J Eng Res Innov [Internet]. 2012;4(2):55–64. Available from: http://ijeri.org/IJERI-Archives/issues/fall2012/papers/IJERI fall 2012 v4 n2 (paper 7).pdf%0Ahttp://www.ijeri.org/issues/fall2012/papers/IJERI fall 2012 v4 n2 (paper 7).pdf
[10] A. H. Radwan, Containers Architecture Reusing Shipping Containers in making creative Architectural Spaces. Int J Sci Eng Res, 6(11), 1562–77 (2015).
[11] S.R. Kellert and E. F. Calabrese, *The Practice of Biophilic Design.* Biophilic-Design.Com. 2015.
[12] R. Berto, The role of nature in coping with psycho-physiological stress: A literature review on

restorativeness. Behav Sci (Basel), 4(4), 394–409 (2014).
[13] A. Kjellgren and H. A. Buhrkall, Comparison of Restorative Effect of a Natural Environment with that of a Simulated Natural Environemnt. J Environ Psychol, 30(4), 464–72 (2010).
[14] R K. Raanaas and K. H. Evensen, Benefits of Indoor Plants on Attention Capacity in an Office Setting. J Environ Psychol, 31(1), 99–105 (2011).
[15] M. Pilotti, E. Klein, D. Golem and E. K. Piepenbrink, Is Viewing a Nature Video After Work Restorative? Effects on Blood Pressure, Task Performance, and Long-Term Memory. J Environ Behav, 47(9), 947–69 (2015).
[16] J. Yin, S. Zhu, P. MacNaughton, J.G. Allen and J. D. Spengler, Physiological and cognitive performance of exposure to biophilic indoor environment. Build Environ (2018).
[17] R. S. Ulrich, How design impacts wellness. Healthc Forum J., 35(5), 20–5 (1992)
[18] U. Nanda, X. Zhu, B. H. Jansen, Image and emotion: From outcomes to brain behavior. Heal Environ Res Des J., 5(4), 40–59 (2012).
[19] S. R. Kellert, *Dimensions, Elements, and Attributes of Biophilic Design*. Biophilic Des Theory, Sci Pract Bringing Build to Life [Internet]. 2008;(January 2008):3–19. Available from: https://www.researchgate.net/profile/Stephen_Kellert/publication/284608721_Dimensions_elements_and_attributes_of_biophilic_design/links/56619da108ae4931cd59f2ed.pdf