

# **The Impact of Biophilic Design on Cognitive Performance in Co-working Spaces**

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## **Abstract:**

This paper explores the positive effect of biophilic design on cognitive performance in working environments in Egypt, such as Co-working spaces. The paper will explore elements of biophilic like vegetation, water, natural light, natural materials, and outdoor and indoor space organization, concerning promoting the psychological aspects of the users. Reducing stress, boosting moods, and improving cognitive performance are the parameters that will evaluate the efficiency of the design. Incorporating natural elements into work environments has been shown to reduce stress, enhance cognitive performance, and increase productivity in various settings globally. The research, based on theoretical frameworks like the Biophilia Hypothesis and Attention Restoration Theory, highlights the role of natural environments in promoting mental clarity and emotional equilibrium. Biophilic design supports sustainable urban development and aligns with the Sustainable Development Goals (SDGs), particularly in health and well-being. New Capital Administrative City- Egypt, is one of

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**Date of submission:1/1/2025**

**Date of Acceptance: 23/1/2025**

Proceedings of the International Conference on Green Design and Smart Cities under  
the slogan Environmentally Friendly Practices in the Digital Age" El Gouna, Egypt -

24:26 January 2025

the newest Egyptian cities; it builds national spirit, provides for long-term sustainable growth, and aims to solve various issues faced by Egypt through a new city. The results of this paper will highlight the main issues that face the stakeholders in a regular working environment set-up, to indicate the importance of the co-working space as a new trend in working environments, all will be applied by analysing different case studies in Egypt. Accordingly, the study will highlight the impact of biophilic design on cognitive performance in Co-working Spaces.

**Keywords:**

Biophilic Design; Human Well-Being; Mental Health; Co-working spaces.

## 1. Introduction:

### 1.1 Background and Context

Co-working spaces are gaining popularity due to changes in workplace culture towards adaptability, teamwork, and creativity. Biophilic design, which reestablishes a connection between humans and nature in built environments, has become a popular method for reducing stress and



Figure 1: Biophilic Design

improving cognitive function (Kellert et al., 2008). Research shows that natural elements like daylight, greenery, and water can improve cognitive function, including memory improvement, creative problem-solving, and attention restoration (Browning, Ryan, & Clancy, 2014). Biophilic design has the potential to revolutionize shared workspaces by catering to the specific needs of diverse users. Indoor environmental quality (IEQ) is crucial for health, well-being, and productivity, especially in workplaces where full-time employees and students spend about one-third of their time indoors (Wargocki et al., 2002). Enhancing the indoor environment and building design can improve well-being, productivity, health, and cognitive function (Al Horr et al., 2016). Biophilic design seeks to strengthen each person's bond with the natural world by integrating natural elements into built environments. Studies have shown that exposure to or immersion in outdoor nature has positive health effects. The benefits of "nature in the space," such as natural light, indoor plants, and window views, are less well understood (Kellert et al., 2008). Natural analogues, such as wooden materials and plants, have been shown to improve positive emotions, comfort, decrease autonomic stress responses, tension, and fatigue, and promote physiological relaxation Yin, J., Arfaei, N., MacNaughton, P., Catalano, P. J., Allen, J. G., & Spengler, J. D. (2019).

## **1.2 Research Problem**

How does biophilic design impact cognitive performance in co-working spaces in Egypt, and what specific elements, such as natural light, greenery, and locally inspired designs, contribute most to enhancing focus, creativity, and productivity in the Egyptian context? Despite Egypt's favorable climate, which includes abundant sunlight, moderate winters, and diverse natural landscapes, biophilic design principles are notably absent in most co-working spaces across the country. Co-working environments are often characterized by their sterile, utilitarian designs, with limited integration of natural elements such as plants, natural light, or outdoor views. This absence is particularly concerning as these spaces aim to foster productivity, creativity, and well-being goals that biophilic design inherently supports. The lack of biophilic features leads to uninspiring work environments that can exacerbate stress, hinder cognitive restoration, and reduce overall user satisfaction. A significant research gap is the paucity of empirical data regarding the effects of biophilic features on cognitive functions like creativity, memory, and focus on shared workspaces. Closing this gap is crucial to maximizing the layout of co-working spaces to improve productivity and user experience. Considering Egypt's unique climatic advantages, such as long daylight hours and opportunities for indoor-outdoor spaces, the current neglect of biophilic principles represents a missed opportunity to create healthier, more dynamic work environments.

## **1.3 Research Objective:**

The objectives include identifying key biophilic elements suited to co-working spaces, and evaluating their impact on cognitive performance, and formulating design strategies to enhance productivity and well-being. Also, by integrating nature-inspired elements, the aim is to create work environments that support mental health, foster creativity, and improve overall functionality, benefiting diverse users in shared professional spaces.

## **1.4 The importance of research:**

The importance of investigating the impact of biophilic design on cognitive performance in coworking spaces stems from its potential to transform how work environments are created and experienced. From freelancers to startups, coworking spaces cater to a wide spectrum of users who need spaces that foster concentration, creativity, and wellbeing. These

needs are met by biophilic design, which creates a more stimulating and healthier environment by utilizing natural elements like organic materials, natural lighting, and greenery. Studies consistently demonstrate that spending time in nature improves cognitive abilities, lowers stress levels, and raises general satisfaction, all of which have a direct impact on output and job satisfaction.

### **1.5 Field of Research:**

My research is scallting in interior spaces and how its quality is affected by the surrounding nature. Biophilia is a concept by which designers could use to affect the quality of the indoor spaces, one of these is the working spaces according using biophilia would affect these spaces and its productivity.

### **1.6. Previous studies & Discussion:**

Biophilic design significantly improves cognitive function in coworking spaces, particularly for professionals seeking wellbeing and productivity. Incorporating plants, natural materials like wood and stone, and large windows with natural light can lower stress levels and create a peaceful environment. Indoor plants enhance air quality and create a connection to nature, increasing creativity and focus. Exposure to natural light from large windows controls circadian rhythms, enhancing mood, vitality, and concentration. Natural materials' visual appeal and tactile characteristics enhance comfort and motivation, creating a cozier work environment. Previous studies have shown that biophilic design components, such as plants, large windows, and natural materials, can significantly reduce stress levels and create a calming atmosphere. Indoor biophilic greening has been found to improve psychological responses and cognitive performance among office workers. Research in Buildings supports the use of natural analogs and spatial configurations inspired by nature, enhancing cognitive performance and providing physiological benefits in workspaces. These findings suggest that biophilic design elements, such as plants, large windows, and natural materials, can foster a sense of connection to nature, boosting concentration, creativity, and overall cognitive function in coworking environments.

## 2. Literature Review

### 2.1 Biophilic Design Principles

#### 2.1.1 Biophilia

Biophilia, derived from the Greek words "bio" (life) and "philia" (love), is the belief that people's innate love for life is what makes them human and connects them to all living things (Wilson, 1984). A 1986 study by psychologist Arne Öhman found that people's response to natural forces and stimuli significantly impacts their performance, well-being, and physical and mental health (Öhman, 1986). Scientific evidence supports this, with various fields including employment, education, health, recreation, housing, and community supporting the idea that nature significantly influences human well-being and fitness. For instance, being in nature can help healthcare professionals feel less stressed, lower blood pressure, and recover faster from illnesses Asher, H. (2024, February 13).



Figure 2: Biophilic design in Co-working space

#### 2.1.2 Biophilic Design

Biophilic design is a philosophy that promotes human well-being by incorporating natural elements into the built environment. This approach strengthens ties to nature, promoting a healthy relationship between humans and their environment. Biophilic design includes features like outdoor views, water features, indoor plants, and natural light. The biophilia hypothesis suggests that people are naturally drawn to nature, and spending time in it benefits their health. Terrapin Bright Green and Interface Flooring have published white papers and developed a Human Spaces website to promote conversation about biophilic design Gillis, K., & Gatersleben, B. (2015).



Figure 3: Gardens by the bay Singapore by Design Hotels.

### 2.1.3 Theory of biophilia to biophilic design

Table 1: The process of translating biophilia hypothesis into biophilic design

	BIOPHILIA HYPOTHESIS	THEORY	IMPACTS OF NATURE	BIOPHILIC STRA Hypothesis	
BIOPHILIA	Fascination capability of nature	Attention Restoration Theory ART	Exposure to natural environment recovers from cognitive fatigue and restores mental capacity	Including views of nature and natural elements in space design	BIOPHILIC DESIGN
	Affiliation for nature	Stress Reduction Theory SRT	Exposure to natural environment recovers from stress	Including natural views and scenes that reflect nature in space design	
	Enclosure and outlook in natural environments	Prospect- Refuge Theory	Inhabiting spaces that provide both prospect and refuge qualities derive feelings of safety and pleasure	Designing spaces that ensure <b>Prospect:</b> terraces, balconies and open areas <b>Refuge:</b> alcoves, screening elements	
	Human evolution on savanna-type landscape	Savanna Hypothesis	Tendency to Savannah-like environments engenders positive emotions and responses	Introducing Savannah-like open spaces with scattered trees and water contrasting with levelled and safe spaces	
	Connection with nature through natural colors	Ecological Valence Theory	Colors relevant to thriving color palettes of nature boost creativity and improve emotional wellbeing	Using natural analogues such as natural colors in space design	

Biophilia, first introduced by Erich Fromm in 1964, refers to the love for life that underlies basic tendencies of living things, such as preserving life from extinction and fostering positive interactions. Edward Wilson's theory, supported by the psycho-evolutionary theory, suggests that humans' emotional bond with life is preserved when moving from a primitive natural environment to an artificial one. Stephen Kellert identified nine values of biophilia Stephen Kellert (1993). The loss of biodiversity is a close connection between biophilic and environmental issues. The concept of biophilia was introduced in architecture to address people's emotional need for in-building interactions with nature. Biophilic design addresses this desire, benefiting living, working, learning, entertainment, and medical settings Zhong, W., Schröder, T., & Bekkering, J. (2021, August 24).

#### 2.1.4 Psychological basis

Biophilia is a psychological concept rooted in the human connection with nature, which has been essential for human survival (Wilson, 1984). Theories like Stress Reduction Theory (SRT) and Attention Restoration

Theory (ART) support this connection, arguing that natural environments have calming effects and aid in cognitive function restoration (Ulrich, 1983). The concept of "prospect and refuge" suggests people seek out environments with open views and security Jay Appleton (1975). Biophilic design can replicate these benefits by incorporating natural elements into indoor spaces, fostering a connection to nature, reducing stress, raising mood, improving cognitive function, and promoting overall psychological and emotional well-being. This connection to nature has been a significant factor in human psychology (Browning, Ryan, & Clancy, 2014).

### 2.1.5 Key Principles

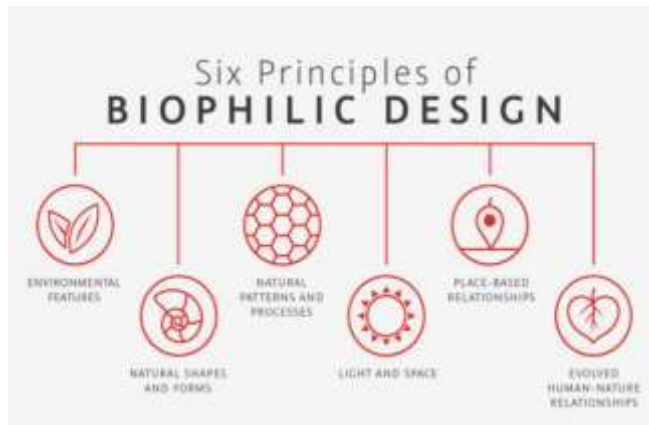


Figure 4: 6 Principles of Biophilic Design by Narkhede, P.

Stephen Kellert, a professor at Yale School of Forestry and Design, developed biophilic design by identifying two dimensions:

place-based dimension links a building or landscape to its local ecology and culture, while the organic dimension reflects human connection to nature. Kellert's six principles provide a framework for integrating nature into projects, fostering well-being and enhancing human-nature connections Thermory. (2023, October 30). These principles intersect with the Attention Restoration Theory and Stress Reduction Theory, highlighting the interconnectedness of nature and human psychology. Firstly, the environmental elements, such as vegetation, water, and outdoor



Figure 5: Environmental Feature by Admin.



views, link indoor and outdoor spaces, facilitating cognitive recovery and promoting mental exhaustion. According to ART, Natural settings with healing qualities help people recover from mental exhaustion, and natural elements like vegetation or water lower cortisol levels, reducing stress (Kaplan, 1995). According to SRT, Nature naturally induces relaxation and lessens negative emotional states, making it an effective way to reduce stress and improve overall well-being (Ulrich, 1984). Secondly, the natural forms and shapes, like fractal and curved patterns, can create a peaceful atmosphere (Kellert, 2005). ART claims that by stimulating the brain without overtaxing it, these forms aid in cognitive recovery. Trees, leaves, and flowers all contain fractal patterns that provide gentle stimuli to help the brain replenish its cognitive reserves (Kaplan & Kaplan, 1989). According to SRT Reflection, natural forms and shapes lessen stress by fostering a calm and relaxed atmosphere, lowering stress hormones, and encouraging comfort (Berman et al., 2008). Also, the natural Pattern and process, like the rhythm of water, tree growth, and light filtering, is highlighted by the biophilic principle (Kellert, 2005). The healing effects of recurring patterns, such as water flowing or shifting shadows, that stimulate the mind and regain focus are the main focus of art reflection (ART) (Kaplan, 1995). The brain can unwind and recuperate from exhaustion thanks to this equilibrium. In line with nature's capacity to alleviate stress and improve mood, SRT Reflection (SRT) focuses on the constant flow of natural patterns and processes that soothe the nervous system, lessen anxiety, and restore emotional equilibrium (Ulrich, 1984). In addition, Light and Space is a principle that involves using natural light to create a connection to the



**Figure 6: Natural shapes and forms by Negi, N.**



**Figure 7: Natural Patterns and processes by Stouhi, D.**



**Figure 8: Light and Spaces by Agata.**

outdoors and designing spaces that feel open and harmonious (Kellert, 2005). Natural light is essential for cognitive recovery because it helps control circadian rhythms and mental fatigue, claims ART Reflection. Ample natural light in well-lit areas encourages alertness and lessens the cognitive strain that artificial lighting causes (Kaplan, 1995). By stabilizing mood and enhancing mental clarity, exposure to natural light can reduce stress, according to SRT reflection. Multiple light sources in well-designed areas can greatly lower psychological stress and improve general wellbeing (Küller et al., 2006).

Moreover, Place-Based Relationships incorporates elements that reflect a place's unique geography, history, or heritage, emphasizing a connection to the local environment or culture (Sullivan, 2003). In line with ART Reflection This idea offers comfort and ease, enabling people to detach from the demands of modern life and concentrate on restorative experiences. It also fosters a sense of belonging, which is essential for cognitive restoration (Kaplan & Kaplan, 1989). Furthermore, SRT Reflection is Strong ties to the environment can foster emotional health and relaxation by reducing feelings of alienation or confusion (Kellert, 2005). Finally, the Evolved Human-Nature Relationships principle recognizes that people are inherently linked to nature and have evolved in natural settings. Design features that capitalize on this connection, like green areas or landscapes, can ease mental exhaustion and aid in healing (Wilson, 1984).

By aligning with natural preferences and offering soothing experiences, ART Reflection proposes that mirror human evolutionary ties to nature aid in healing (Kaplan & Kaplan, 1989). According to SRT Reflection, people are naturally inclined to react favorably to nature, which mimics ancestral settings to lower stress and improve mood (Ulrich, 1984). To sum up, both ART and SRT theories emphasize that our cognitive and



**Figure 9: Light and Spaces by Thermory.**



**Figure 10: AZULIK City of Arts by Rodriguez, M. D.**

emotional states can be significantly influenced by environmental factors. The six principles of biophilic design reflect these theories by showcasing how nature-based elements help restore attention, improve mood, and reduce stress. These principles work together to create environments that support well-being by providing both cognitive restoration and emotional comfort, supporting the idea that nature is crucial for human health and functioning.

### **2.2.1 Cognitive Performance in Work Environments**

Environmental theories explore how physical spaces impact mental functions like memory, attention, problem-solving, and emotional health. Key models include Kaplan's Model of Environmental Preferences, Prospect-Refuge Theory, Cognitive Appraisal Theory, Environmental Behavior Theory, Attention Restoration Theory (ART), Stress Reduction Theory (SRT), and Environmental Stress Theory. ART suggests natural settings replenish cognitive resources, while SRT suggests that being in nature lowers stress and anxiety (Kaplan, 1995). Environmental stress theory examines the impact of environmental stressors on cognition, while Prospect-Refuge Theory suggests humans are naturally drawn to environments that offer both prospect and refuge (Lazarus, 1991). Cognitive appraisal theory suggests that emotional and physical reactions are linked to cognitive assessment, and well-designed environments can improve productivity, creativity, and cognitive function. Kaplan's Model of Environmental Preferences focuses on how people's preferences for environments impact their cognitive engagement (Kaplan & Kaplan, 1989). The impact of biophilia on productivity is demonstrated through a combination of surveys, objective metrics, and analysis. Surveys gather qualitative information like comments on how exposure to natural surroundings enhances mental clarity in addition to quantitative data like self-reported levels of energy, creativity, and focus. Measurable productivity outcomes are provided by objective metrics, such as absenteeism, error rates, and task completion rates. While comparisons between biophilic and non-biophilic spaces reveal notable differences, statistical analysis, including regression and correlation, demonstrates the strength of the relationship between productivity and exposure to biophilic elements. Participants may report 30% more focus and 18% higher task completion rates, for instance, when they are in biophilic environments.

The idea that biophilic design promotes improved workplace performance is supported by this comprehensive approach.

### **2.2.2 Metrics for evaluating cognitive performance**

Cognitive performance metrics are crucial for understanding how people interact with their environment, process information, and solve problems. These metrics include processing speed, memory recall, creativity, and cognitive flexibility (Diamond, 2013). Common tests include the Continuous Performance Test, Stroop Test, Digit Span Test, and Sustained Attention to Response Task. Memory recall is essential for retrieving information from long-term memory. Creative thinking is assessed through divergent thinking tests, while cognitive flexibility involves switching between tasks or mental sets. Processing speed measures how quickly a person can comprehend and react to information. These metrics help promote cognitive development and improve mental health environments (Jung, 2020).

### **2.3.1 Co-Working Spaces**

Co-working spaces have evolved significantly due to changing work cultures, technology advancements, and the need for flexibility. Originating in the early 2000s, they cater to specialized industries like media, technology, and arts (Spinuzzi, 2012). The gig economy and remote work have increased demand for flexible office solutions (Brown, 2017). The COVID-19 pandemic has further influenced these spaces, offering private offices, meeting spaces, wellness initiatives, and work-life balance (Deskmag, 2020).



**Figure 11: Biophilic Design in Co-Working space by Kelly, K.**

### **2.3.2 Design challenges unique to shared, flexible environments**

Co-working space design is a complex task that requires balancing user diversity, technology, privacy, and collaboration. Designers should create spaces that support teamwork and individual concentration, combining adaptable areas with communal areas and private booths (Jang, 2018). The spaces should be flexible, use movable partitions and modular furniture, integrate technology, accommodate diverse industries, work styles, and cultural backgrounds, and balance aesthetics and functionality (Spinuzzi, 2012). Noise management is crucial, and strategically positioned areas

promoting social interaction prevent disruptions to peaceful work zones (Bouncken & Reuschl, 2018).

## **2.4 Cognitive Performance**

Cognitive performance, a crucial aspect of brain function, is often affected by traumatic brain injuries, impacting common functions like attention, focus, speech, language, memory, reasoning, planning, and problem-solving. Disfunction can be subtle and limited to demanding situations (2024, April 26). High cognitive performance, or "peak brain performance," is essential for success in professional settings and the modern labor market. Cognitive stimulation has gained attention as a mental exercise method for Health System (n.d.). A decline in cognitive functioning may result in diminished mental and physical reactions to surroundings Harvey, P. (2019, September 21).

## **2.5 Biophilic Design and Cognitive Outcomes**

Biophilic design, incorporating natural elements into built environments, has been proven to improve satisfaction, emotional well-being, and cognitive performance in both corporate and educational settings. In educational settings, it enhances academic performance, focus, retention rates, stress reduction, and engagement. In business environments, it leads to higher employee creativity, productivity, and lower absenteeism Kellert (2005). However, cost limitations and reluctance to change institutional structures remain obstacles to implementation. Future studies should explore how biophilic components combine with demographic variables to maximize their effects Bouncken and Reuschl (2018). Co-working spaces face research gaps on long-term impacts, mental health, post-pandemic hybrid work models, sustainability, emerging technologies, and social dynamics. Addressing these gaps will guide their evolution into flexible, sustainable, and inclusive workplaces.

## **2.6 The impact of biophilic design on cognitive performance in co-working space**

Biophilic design is a sustainable approach to incorporating nature into built environments, aiming to promote wellbeing and environmental preservation. It focuses on multisensory interactions with nature, which can improve mental, emotional, and physical health Zhang, P., Yu, Z., Hou, G., Shu, P., Bo, Y., Shi, Y., & Nie, R. (2024). Urban dwellers spend over 90% of their time indoors, leading to increased stress and exhaustion. Biophilic design aims to reduce weariness and stress, promoting psychological restoration through nature contact. Three types of biophilic design patterns include nature of space, nature in the space, and natural analogs. Research on biophilic design can help identify its benefits for psychological healing and direct real-world implementations in offices.

However, more research is needed to fully understand the variety of biophilic design patterns Morley, M. (2024, June 23).

### 3. Methodology

#### 3.1 Research Design

Biophilic design in co-working spaces enhances cognitive performance by incorporating natural elements that improve memory, creativity, focus, and overall well-being. Features like natural lighting, indoor plants, water elements, and outdoor views promote stress reduction and mental restoration, aligning with Attention Restoration Theory (ART) and Stress Reduction Theory (SRT) (Ulrich, 1983). This study investigates the impact of biophilic design on cognitive performance in co-working spaces using a mixed-methods approach. The New Administrative Capital in Egypt is an ideal setting for implementing biophilic design due to its modern infrastructure and focus on sustainability. The city's favorable climate allows for indoor-outdoor spaces, natural ventilation, and rooftop gardens, maximizing design benefits (Hassan, 2020). Biophilic co-working spaces in Egypt could promote healthier work environments, attract businesses, and set a benchmark for sustainable urban development (Browning, Ryan, & Clancy, 2014). The interview with Egyptian coworking space stakeholders are optimistic about incorporating biophilic design elements to improve cognitive performance. They believe natural elements like plants, lighting, and water can create a productive and calming environment, improving focus, creativity, and problem-solving abilities. The climate and culture of Egypt could influence the integration of these elements, particularly in temperature and space design. Strategic planning and prioritizing green walls and large windows can mitigate practical considerations like budget constraints and maintenance challenges. Overall, biophilic design could significantly improve the future of coworking spaces in Egypt, promoting well-being and productivity.

#### 3.2 Case Study

##### A. Second Home Co-Working Space (London, UK):

Second Home, a London co-working space, is a nature-infused environment designed by SelgasCano Architects to boost productivity and well-being. With over 6,500 plants and trees, the space features transparent walls, vibrant interiors, and adaptable layouts.



Figure 12: Second Home Co-Working Space (London, UK)



It uses sustainable materials, eco-friendly materials, and energy efficiency to reduce urban heat island effects. Second, Home hosts workshops, social gatherings, and cultural events, promoting community involvement and a new benchmark for global co-working spaces.

### **B. SelgasCano Architecture Office (Madrid, Spain):**

The SelgasCano Architecture Office, designed by José Selgas and Lucía Cano, is a prime example of biophilic and sustainable design. Located in Madrid, Spain, the office features transparent walls, minimal environmental impact, and lively interiors. Its open design encourages teamwork and promotes creativity, while its proximity to nature enhances cognitive function. SelgasCano exemplifies how architecture can balance nature with human and environmental needs Saieh, N. (2024, July 25).



**Figure 13: SelgasCano Architecture Office (Madrid, Spain) by Saieh, N.**

### **C. Amazon Spheres (Seattle, USA):**

Amazon Spheres, located in Seattle, are a biophilic corporate architecture that features three interconnected glass domes as collaborative workspaces and a botanical conservatory. The design includes vertical gardens, a lush indoor forest, and a rainforest microclimate. The glass and steel geodesic domes allow natural light and promote collaboration, stress reduction, and creative thinking. The energy-efficient systems minimize artificial lighting and HVAC use, while the Understory visitor center informs guests about the project's sustainability tenets Tapia, D. (2024, October 14). To cut it short, Biophilic design principles have been proven to enhance cognitive function, creativity, productivity, and overall well-being in co-working spaces. These spaces promote mental clarity, lower stress levels, and strengthen a connection to nature by incorporating natural elements like plants, natural lighting, and organic materials. Examples of such spaces include Second Home in Seattle, SelgasCano



**Figure 14: Amazon Spheres (Seattle, USA) by Tapia, D.**

Architecture Office in Madrid, and Second Home in London. Second Home uses over 2,000 plants to create a lush, green space, while SelgasCano uses natural lighting, outdoor views, and transparent materials to elevate the atmosphere and increase output. The Amazon Spheres in Seattle uses abundant natural light and vegetation to establish a direct connection to nature, promoting a lively, biophilic environment. Large windows provide natural light, raising serotonin levels and enhancing mental clarity. Incorporating biophilic elements into co-working spaces can improve user experience by creating a cozy, inspiring, and productive environment. Natural materials like bamboo, stone, and wood provide warmth and authenticity, while plants absorb pollutants and raise oxygen levels.

#### 4. Results

As a result, the study emphasizes how biophilic design in Co-Working space can have a profoundly positive effect on sustainability, well-being, and mental health. Biophilic design incorporates natural elements such as light, greenery, water features, and organic materials to improve cognitive performance, lower stress levels, boost the productivity, improve mood and creativity.

In line with the Sustainable Development Goals (SDGs), this strategy encourages emotional equilibrium and general human flourishing while raising environmental awareness through energy-efficient practices and sustainable material use. By highlighting the incorporation of nature as

a fundamental design principle, biophilic design also advances interior design theory and practice. Also, I made a survey to 25 persons that they went to co-working space before and never see biophilic design in co-working space before in Egypt. And 92% agree that biophilic design affect their concentration better and more relaxed in biophilic design.

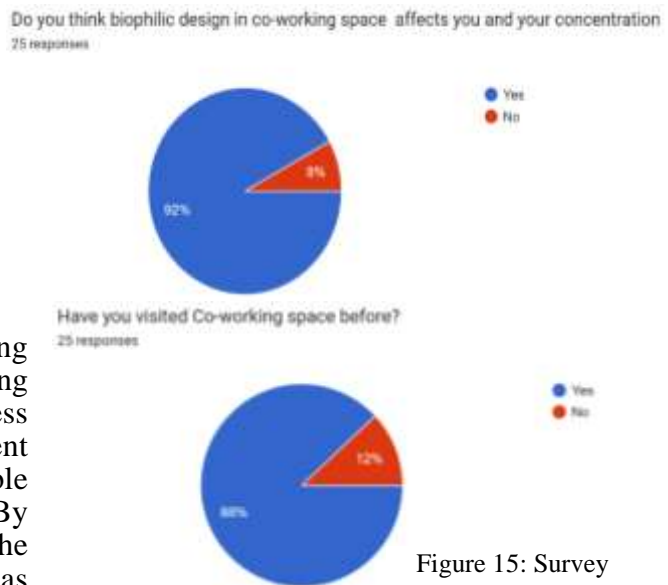


Figure 15: Survey



## 5. Conclusion

This study explores the impact of biophilic design on cognitive function in co-working spaces. It focuses on the growing trend of co-working spaces, which prioritize flexibility, teamwork, and individual productivity. The study examines how biophilic features affect cognitive functions like memory, focus, and problem-solving. It also explores contemporary design technologies like air quality systems and circadian lighting. The study provides data-driven insights into the effects of biophilic design on teamwork, creativity, and productivity. Biophilic Design is a design approach that incorporates natural elements like light, greenery, water features, and organic materials to improve cognitive performance, reduce stress, and enhance productivity. It aligns with the Sustainable Development Goals and promotes emotional equilibrium and environmental awareness. Successful implementation can lead to reduced absenteeism, increased productivity, and higher employee retention.

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## تأثير تصميم البيوفيليك على الأداء المعرفي في مساحات العمل المشترك

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المستخلص:

تستكشف هذه الورقة التأثير الإيجابي للتصميم الحيوي على الأداء المعرفي في بيئات العمل في مصر، مثل مساحات العمل المشتركة. سوف تستكشف الورقة العناصر الحيوية مثل الغطاء النباتي، والمياه، والضوء الطبيعي، والمواد الطبيعية، وتنظيم الفضاء الخارجي والداخلي، فيما يتعلق بتعزيز الجوانب النفسية للمستخدمين. يعد تقليل التوتر وتحسين الحالة المزاجية وتحسين الأداء المعرفي من العوامل التي ستقيم كفاءة التصميم. ثبت أن دمج العناصر الطبيعية في بيئات العمل يقلل من التوتر، ويعزز الأداء المعرفي، ويزيد الإنتاجية في مختلف البيئات على مستوى العالم. يسلط البحث، الذي يعتمد على أطر نظرية مثل فرضية البيوفيليا ونظرية استعادة الانتباه، الضوء على دور البيئات الطبيعية في تعزيز الوضوح العقلي والتوازن العاطفي.

يدعم التصميم الحيوي التنمية الحضرية المستدامة ويتوافق مع أهداف التنمية المستدامة (أهداف التنمية المستدامة)، وخاصة في مجال الصحة والرفاهية. العاصمة الإدارية الجديدة – مصر، هي من أحدث المدن المصرية؛ فهي تبني الروح الوطنية، وتوفر النمو المستدام على المدى الطويل، وتهدف إلى حل مختلف القضايا التي تواجهها مصر من خلال مدينة جديدة. ستسلط نتائج هذه الورقة الضوء على القضايا الرئيسية التي تواجه أصحاب المصلحة في بيئة العمل المنتظمة، للإشارة إلى أهمية مساحة العمل المشترك كاتجاه جديد في بيئات العمل، وسيتم تطبيق كل ذلك من خلال تحليل دراسات الحالة المختلفة في مصر. وبناء على ذلك، ستسلط الدراسة الضوء على تأثير التصميم الحيوي على الأداء المعرفي في أماكن العمل المشتركة.

#### الكلمات المفتاحية:

التصميم الحيوي؛ رفاهية الإنسان؛ الصحة العقلية؛ مساحات العمل المشترك.