

Biophilic Design as a Part of Interior Design Education: Well-Being, Student Creativity, and Sustainable Development Goals

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Abstract

Objectives: The paper focuses on how biophilic design fits within a curriculum of interior designing and how it can affect the creativity and well-being of students and their contribution towards the Sustainable Development Goals (SDGs). The paper by locating biophilic design as an educational strategy emphasizes the contribution of biophilic design to the human-centered and sustainability-oriented learning in interior design education.

Methodology: It employed a convergent parallel mixed-methods design approach and combined both quantitative and qualitative data through surveys, a case study, semi-structured interviews, and design evaluations of 50 undergraduate students and 5 faculty members in the University of Petra. Chosen graduation projects were examined to assess how biophilic principles of design can be applied in education.

Findings: The results show that, biophilic design interventions including green vegetation, natural light and raw materials are important in promoting creativity, emotional well-being, and sustainability awareness of students. The quantitative analysis indicated that there was statistically significant correlation between biophilic integration and the quality of the project ($p < 0.01$) whereas qualitative analysis indicated that empathy, design confidence, and sustainable decision-making increased.

Implications: The paper indicates that biophilic pedagogy is a scalable and transformational solution to interior design education and is in line with SDGs 3, 4, 11, and 12 and can facilitate healthy learning conditions, quality education and sustainable design practices.

Conclusions: The findings indicate that biophilic design can contribute to the future-oriented, environment-aware, and human-focused design thinking, equipping students with the ability to solve the challenges of sustainability in the field.

Key words

Biophilic Design, Graduation Projects, Sustainable Development Goals.

Introduction

Biophilic design has become an interdisciplinary method bringing architecture, psychology, sustainability, and pedagogy closer together, and reconnecting people with nature (Kabinesh et al., 2024). The biophilia hypothesis and the frameworks developed to encompass this development (Browning & Ryan, 2020) illustrate how natural light, materials, and vegetation can create restorative human-centered spaces. Recent research provides evidence that biophilic design supports well-being, creativity, and sustainability awareness, particularly in educational settings (Yildirim et al., 2023; Obeidat et al., 2024). Biophilic design transcends mere decoration; scholars emphasize its role in fostering ecological responsibility, resilience, and sustainable design among students (Ebbini, 2022). Biophilic strategies in interior design have gained recognition for their ability to reduce stress, enhance concentration, and positively impact health outcomes. Research shows that these natural solutions can lower blood pressure, improve emotional management, and boost productivity and creativity (Quispe-Vargas et al., 2024).

These advantages are particularly relevant in an academic context, where the performance of learners and design professionals is closely linked to their psychological well-being and familiarity with the physical world. The training offered in interior design is another essential way to prepare professionals to tackle the challenges of global sustainability by providing innovative and human-centered solutions. Design innovation is not the only benefit that can arise from implementing biophilic principles through scholarly research; this approach can also foster a greater sense of ecological responsibility. The significance of interior design in enhancing quality of life, as emphasized by organizations like FIDER (2003), is closely linked to the concept of biophilic design (Obeidat et al., 2024). FIDER (2003) defines interior design as a field fo-

cused on improving life quality through experiential spaces, and biophilic principles play a crucial role in achieving this goal (Narula, 2024). The integration of these principles in higher education fosters emotional stability, empathy, and student creativity (Ebbini, 2022).

The concept of biophilia in design pedagogy enables students to critically engage with the built environment by using nature as a medium for healing and sustainability (Wijesooriya, 2022). This approach helps students develop greater empathy for users and promotes conscious sustainability practices. They explore organic forms, natural textures, and immersive ecological systems (Ghaziani, 2021; Jensen et al., 2020).

Since 2020, there has been an increasing emphasis in the literature on the connection between biophilic design patterns and the United Nations Sustainable Development Goals (SDGs). For instance, the use of natural ventilation and daylighting supports SDG 7 (Affordable and Clean Energy), while the selection of raw and locally sourced materials contributes to SDG 12 (Responsible Consumption and Production).

Biophilic learning spaces promote SDG 4 (Quality Education) by creating emotionally safe environments for learning. Yadav and Siddiqui (2024) differentiate between biophilic design and traditional practices, highlighting the multidimensional use of natural systems. They argue that biophilic design goes beyond the ornamental use of plants. Additionally, Zhong et al. (2022) emphasizes the importance of biophilic elements in enhancing workplace performance, social well-being, and health outcomes, which are increasingly recognized as integral to sustainable design. This review supports the adoption of biophilic design as an effective approach and a new model for sustainability in the field of interior design.

This project explores the incorporation of biophilic design in the graduation projects of senior interior design students at the University of Petra. By examining how students integrate natural features into their spatial solutions, this study will evaluate the effects of biophilic design on creativity, emotional well-being, and knowledge of sustainable development (Yildirim et al., 2023; Wijesooriya, 2022). Additionally, it aims to establish biophilic education as a revolutionary educational tool that aligns with global objectives, such as the Sustainable Development Goals (SDGs). Key goals discussed include SDG 3 (Good Health and Well-being), SDG 4 (Quality Education), SDG 11 (Sustainable Cities and Communities), and SDG 12 (Responsible Consumption and Production) (Browning & Determan, 2024). The paper intends to establish these goals through the following questions:

1. What are the impacts of biophilic characteristics on the physical well-being and idea flow of interior design students?
2. Which resources and spatial activities can best integrate biophilic design into academic projects?
3. When designing educational buildings based on the integration of biophilic principles, what should we consider aligning with the aims of the UN Sustainable Development Goals?

Contributions: The present research adds to the developing body of knowledge in the specter of sustainable design pedagogy by presenting how biophilia design can affect emotional wellness, cognitive capacity, and environmental ethics among design students. It proposes a model of integrating biophilic strategies within interior design curriculum and introduces results of studies establishing a causal connection between biophilic strategies and quantifiable impacts on creativity, user-centered thinking and sus-

tainable practice.

Gaps in Literature:

Most studies on biophilic design generally focus on workplaces and healthcare settings. However, there is limited literature on the pedagogical applications of biophilic design in educational contexts. This paper addresses that gap by presenting a contextual study based on an institution of higher education and outlining student projects that demonstrate the meaningful outcomes of biophilic learning. Additionally, the paper attempts to map these efforts into global sustainability goals. It is important to note that biophilic design has typically not been discussed as a design question but rather as a functional, emotion-oriented approach to creating successful spaces (Dalay & Aytaç, 2022).

Theoretical Framework

The theoretical basis of the present study is grounded in the biophilia hypothesis articulated by Edward O. Wilson (1984), which posits that human beings possess an innate affinity for nature (Barbiero, 2023). Building on this foundation, theorists such as Stephen Kellert have expanded the concept into systematic frameworks for applying biophilic principles to architecture and spatial design (ADD REFERENCE HERE). Kellert (YEAR HERE) identified two key dimensions of biophilic design: direct and indirect experiences of nature, and the experience of space and place. These dimensions elucidate how designed environments can enhance human health, cognition, and emotional well-being (Milliken et al., 2023).

Browning and Ryan (2020) further refined this framework by proposing 14 patterns of biophilic design, including natural lighting, non-rhythmic sensory stimulation, and biomorphic forms and materials that evoke connections to nature. These patterns hold relevance for educational settings, where they have been shown to foster creativity, reduce stress, and heighten

environmental awareness.

Complementing this perspective, environmental psychology offers insights into how physical environmental features influence human behavior. Research demonstrates that exposure to natural elements in learning environments can improve concentration, emotional regulation, and cognitive performance (Zhang et al., 2024; Peters & D’Penna, 2020). Collectively, these theoretical perspectives support the central premise of this study: that biophilic design can create educational spaces that are both emotionally and cognitively supportive. Looking forward, Coles and Costa (2023) argue that biophilic approaches will become central to urban planning, necessitating nature-based strategies that address the diverse needs of contemporary cities.

Drawing from this theoretical foundation, the present research advances three primary hypotheses examining the relationship between biophilic design and educational outcomes:

H1: Interior design students who incorporate biophilic elements (e.g., daylight, natural materials, vegetation) into their projects will demonstrate higher levels of creativity compared to those who do not.

H2: Students’ emotional well-being and project satisfaction will be positively associated with the presence of biophilic features in their design work.

H3: Exposure to biophilic design principles will enhance students’ awareness of sustainability and strengthen their commitment to sustainable practices, aligning with the United Nations Sustainable Development Goals (SDGs).

These hypotheses are grounded in both empirical literature and theoretical propositions regarding the

psychological, cognitive, and ethical dimensions of biophilic design. They provide the structural framework for the study’s data collection and analysis procedures.

Research Methodology

Research Design: A convergent parallel mixed methods research design was adopted to assess the impact of biophilic design on the creativity, well-being, and sustainability awareness of interior design students. The analysis included both quantitative and qualitative approaches; the data were collected, discussed, and evaluated separately. However, in the interpretation section, the findings were integrated to provide a comprehensive understanding of the phenomenon.

Data Collection: The study utilized various research instruments, including case studies, semi-structured interviews, surveys, and classroom observations. The case study analysis focused on three graduation projects that incorporated biophilic design rubric, which included elements such as natural lighting, greenery, textures, airflow, and sensory experiences.

To understand the motivations behind design decisions, as well as the challenges and benefits of using biophilic strategies, the researcher conducted semi-structured interviews with faculty and students. Additionally, a survey was carried out to five faculty members and 50 students, featuring Likert-scale and open-ended questions concerning their beliefs on issues related to creativity, well-being, and sustainability. Example survey items included: “The introduction of natural light enhanced my creativity,” and “The use of greenery lowered my stress levels.” Responses were assessed on a 5-point Likert scale, where 1 represented “Strongly Disagree” and 5 represented “Strongly Agree.” The open-ended questions encouraged participants to reflect on how biophilic charac-

teristics impacted their well-being and their understanding of design principles.

Finally, classroom observations were conducted to assess how students responded to the inclusion of biophilic elements and design methodologies.

Sample: The case studies were selected from graduation projects at the University of Petra, an institution whose curriculum emphasizes sustainable design and innovative pedagogy, making it an ideal context for examining biophilic integration in design education. This focus on sustainability and creativity in design pedagogy provided a rich environment for investigating research questions.

The sample consisted of three components: three exemplary student projects that demonstrated extensive use of biophilic elements, fifty senior students who participated in the survey, and five faculty members who contributed to interviews and project assessments.

While this single-institution approach offers in-depth contextual understanding, it presents limitations in generalizability across different cultural and institutional contexts. The findings may not be readily transferable to universities with different curricular emphases or pedagogical approaches. Future research should incorporate cross-institutional and cross-national comparative samples to enhance external validity and broaden the applicability of the findings.

Data Analysis

The study employed a mixed-methods approach to data analysis. Quantitative data were analyzed using SPSS v28, applying descriptive statistics, cross-tabulations, and Pearson correlation coefficients (r). Statistical significance was set at $p < 0.05$, with correlations of $r \geq 0.60$ considered strong. Effect sizes were

calculated to determine the magnitude of observed relationships.

Qualitative data from interviews and case studies were thematically coded using NVivo software (Isangula et al., 2023). The analysis followed an inductive coding process, with preliminary codes derived directly from student interviews and project reports. These codes were subsequently synthesized into broader themes, including creativity and innovation, psychological well-being, and sustainability awareness. For example, repeated references to “enhanced focus” and “decreased anxiety” were clustered under the well-being theme and corroborated through triangulation of interviews, case studies, and survey comments.

The integration of quantitative and qualitative findings revealed consistent patterns linking biophilic design features to improved educational outcomes.

Validity and Reliability

Validity was addressed through triangulation of multiple data sources, including surveys, interviews, and case study observations. Survey instruments were pre-tested and demonstrated high internal consistency (Cronbach’s $\alpha = 0.80$). Expert review and validation further enhanced the reliability of the measurement tools (Malapane & Ndlovu, 2024).

Ethical Considerations

The study received ethical approval from the Research Ethics Committee of the University of Petra. All participants provided informed consent before participation. Anonymity and confidentiality were maintained throughout the research process.

Results

Descriptive Statistics: A total of fifty senior students and five faculty members participated in the

survey, demonstrating a high perceived value of biophilic design in educational settings. Among students, 82% reported increased creativity when incorporating biophilic elements, 76% experienced enhanced emotional comfort, and 70% of faculty observed improved student engagement and innovation. The most influential biophilic features identified were daylighting, multi-sensory elements (including water features and natural sounds), natural materials (such as wood and stone), and live planting.

Hypotheses Testing

Statistical analysis and qualitative evidence provided support for all three hypotheses, demonstrating significant relationships between biophilic design elements and educational outcomes.

H1 Supported: Analysis revealed a significant positive correlation between creativity measures and the incorporation of biophilic design elements ($r = 0.62$; $p < 0.01$), confirming that exposure to natural features enhances innovation in student work.

H2 Supported: Biophilic elements in student projects were associated with improved emotional well-being and project satisfaction, as evidenced by both student self-reports and faculty observations.

H3 Supported: Students who incorporated local and natural materials along with natural systems into their designs demonstrated significantly higher sustainability awareness and alignment with the SDGs. These students exhibited enhanced capacity to integrate ethical and environmental considerations into their work.

Additional Findings

Beyond the hypothesis testing, the study yielded insights into material preferences, design applications, and pedagogical outcomes.

Material Preferences and Design Applications

Analysis of design element preferences revealed the following hierarchy: natural daylight, water features, raw wood, indoor plants, and organic spatial forms. These preferences were exemplified in three case studies that demonstrated diverse applications of biophilic principles. A healing center utilizes skylights, living walls, and natural materials to create an environment conducive to emotional and psychological restoration. A school of fine arts incorporated bamboo, curved forms, and strategic daylighting to foster an artistic and relaxed atmosphere. A Falling-water-inspired hotel design integrated green terraces, local stone, and forest views to stimulate sensory experience and tranquility.

Pedagogical Implications

The Graduation Project course at the University of Petra requires senior interior design students to integrate creativity, technical proficiency, and sustainability. Within this context, biophilic design served as a catalyst for innovation, enabling students to critically reassess conventional notions of aesthetics and functionality. Students adopted a more holistic approach to design, viewing it as a multi-sensory and experiential discipline that connects human well-being with spatial strategies.

Biophilic interventions encompassed ergonomic eco-furniture, sustainable wall and floor coverings, optimized spatial lighting, and nature-inspired visual art. This process fostered independence, critical thinking, and adaptability among students while enhancing active learning and aligning their design vocabulary with international sustainability objectives (Karaman & Avci, 2022; Ebbini, 2022). Early-stage faculty guidance on biophilic principles increased student motivation, design empathy, and sustainable material selection. These findings suggest that biophilic education may cultivate a generation of sustainability-ori-

ented and creatively empowered designers (Mallen et al., 2020).

Case study 1: Healing center building

Design concept: The mind, body, and soul are interconnected, highlighting the importance of the built environment in influencing both the health and psychological well-being of patients. Key factors in this consideration include site and layout preferences, access to natural light, the presence of large openable windows, local vegetation, and exterior views. The goal of such a project is to create a therapeutic setting that supports both mental and physical recovery (An-nisa & Rahman, 2023). The student was engaged with the ideas of interior design that integrate elements of nature.

Biophilic Design Elements

The projects incorporated key biophilic design aspects, including natural light through skylights and wide windows, interior plants and living walls, stone and wood finishes, and water features for relaxation.

Design Results: The sensory and emotional impact of the projects was assessed through interviews and observations. Students reported that nature-integrated design was more inspiring and fostered deeper emotional and empathetic connections. As demonstrated in Figure 1, the inclusion of nature-based elements such as skylights and living walls provided evidence of how students translated theoretical concepts into practice to reinforce well-being and restorative design outcomes.

Figure (1): Living walls and skylights help to facilitate restorative design.



Case study 2: Design of Fine Art School

Design Concept: This case study examined the capacity of biophilic design to foster creativity within learning environments (Thermory, 2022). The student employed organic structures and natural materials to create an artistic atmosphere.

Biophilic Design Elements

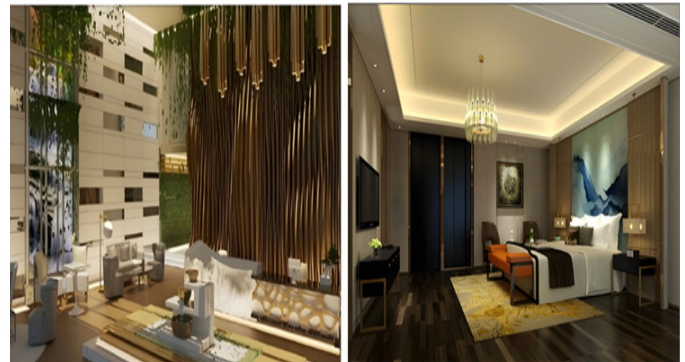
The design featured curved spatial planning, glass facades integrated with indoor planters, bamboo wall finishes, light wood furniture, and strategic use of daylight with solar-based fenestration patterns.

Design Results: The result of the biophilic design is the fact that it has a positive outcome on the health and makes the people closer to nature. The pupil referred to another activity that is more sensible and positive, namely, designing. The trainers have observed that the space offered exploration and interaction among the users. Figure 2 demonstrates how organic spatial planning and bamboo finishes enhanced creativity and social interaction in student projects.

Figure (2): Creativity was augmented by bamboo finishes and curved shapes.



Figure (3): Fallingwater-inspired design connected the local context & landscape.



Case study 3: Hotel Design

Design Concept: The principles of design of the given work, in their turn, also got related to the concept of Fallingwater designed by Frank Lloyd Wright, so, the resemblance to the landscape turned out to become the decisive factor (Zipf, 2020). It was named in this way to imagine desolation which can be combined with nature building.

Biophilic Design Elements

- Architecture of the locality and local stones
- Floor to ceiling windows gazing and skylight
- Green terrace combine-ins with water features
- Earthy undertones because of the adoption of the surrounding forest around them.

Design Outcomes: The result of the design would make the visitors feel free and experience a peaceful environment. The student has mastered the ability of meshing the environment because it has undergone it in the tabulates of survey response, Figure 3 presents its design using the inspiration of Fallingwater to signify that the students could integrate local material and nature landscape in complete spatial experience.

There are compelling reasons to believe that biophilic design can enhance the spatial, functional, and emotional quality of interior environments while also supporting sustainable objectives. Specifically, the incorporation of nature and biophilic design concepts was evident in every graduation project, with a strong emphasis on improving user well-being and their positive outlook regarding the built environment (Bhaskar, 2023). A description of the application of the main materials that helped to comply with the biophilic design patterns is provided here. Glass, wood, and greenery. The purposely constructed combination of such materials was to establish equilibrium between the man-made space and the natural one.

Using glass to bring natural daylight into interior spaces effectively frames views of the surrounding vegetation, enhancing the visual connection between the interior and exterior. The transparent quality of glass fosters a strong relationship between the occupants and their environment, promoting a sense of openness and visual integration. Additionally, platforms, furniture, and accent surfaces are made comfortable and aesthetically pleasing using naturally patterned and warm-toned wood. This wood contributes to a welcoming atmosphere and evokes the sensory qualities found in nature (Rashdan & Ashour, 2025).

The use of wooden elements helped connect the

interior spaces to natural materials, fostering a sense of calm and visual comfort for the building's occupants. Additionally, incorporating greenery, such as vertical gardens and indoor plants, further supported biophilic principles. These features improved the quality of the internal environment, relaxed inhabitants, and added vibrant visual interest to the areas (Andriienko & Panyuta, 2023).

The items that infused life and movement into the artwork, i.e., enhanced both the emotional and physiological experiences of the people who engaged with it, were potted plants, vines, and eco-partitions. These material choices demonstrated how human-centered design could be achieved through biophilic design principles. The students showcased their ability to prioritize ecological awareness over mere aesthetics, creating interiors that promote spiritual and psychological well-being. In addition to being academically successful, these projects served as a pedagogical tool, not only in the teaching of design but also as a foundation for future biophilic applications. In Table 1, the materials are categorized to illustrate how students utilize their choices to achieve sensory, ecological, and sustainable effects.

Table (1): Materials Correspond to Sustainability and Sensory Result.

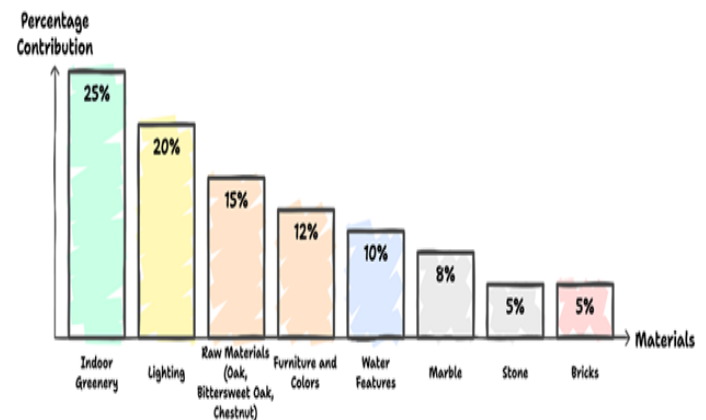
Materials Name	Wood: Oak Wood, Bittersweet Oak, Chestnut	Marble: Bat Ticino, Madura light Pink	Stone: Travertine Casa Antico, Cote D'Azur	Bricks: Cream and White-wash	Indoor Greenery: Mini Bamboo, Palm, Tropical indoor Plants, Sansevieria
Properties	Easy to maintain Provides a strong, durable surface and chipping.	Durable and visible.	Soft and delicate.	Storing heat and cool air.	Bamboo is one of the most popular items of Fung Shui.
Excellent solution for high traffic areas. Comes in a wide range of colors, and different sizes.	Comes in many colors, and different sizes.	Engrave with stylish textures and designs.	Natural stone has its own special charm.	Balance air humidity.	It's known to attract positive energy, and the three stalks represent the blessings of happiness, good fortune and long life.
Use in high moisture rooms. It's easier to install than other traditional surfaces.	Used for floors, walls, and hallway columns.	Easy to install.	Able to elevate any space to the highest levels of elegance	Best noise absorption between individual rooms	Tropical plants improve mood, reduce fatigue, and lower stress and anxiety. It also improves office performance and focuses on and improves air quality.
Materials Name	Lighting: Natural Light: Sky light Artificial Light: LED Panel, LED, Strip, and LED Bulb	Water: Indoor and Outdoor Water Feature	Furniture & Color Scheme: Modern and Comfy Furniture, Earthy Colors		
Properties	Thermal efficacy, luminous efficacy, color rendition, lamp life, modeling of form, contact with environment, and natural perception.	Improve the air's humidity and purify indoor air.	Minimalism, simple yet stylish Eco-friendly materials.		
	Higher efficiency, small heat dissipation, specific emission range, uniform illumination, longer lifespan, greater robustness, safety, and small size, quick on/off time and easy to dim.	Soothing and calming effects are due to the sound of running water.	Aesthetic and timelessness Comfort and ergonomics.		
		Uplift spirits and give more energy.	Sustainable and environmental consciousness.		
		Relieve Anxiety and improve sleep. (Mofatteh, 2021) Aesthetic appeal.	Easy to clean and maintain Enhance interior design. Relieve Anxiety. Create a calming and soothing atmosphere. Give a sense of grounding and stability.		

In reviewing materials that enhance biophilic interior design, it was found that indoor greenery was the most frequently mentioned element, accounting for approximately 25% of all materials. This is because greenery plays a significant role in creating a connection with nature. In terms of lighting, both artificial and natural sources made up about 20% of the materials used, contributing to a sense of natural perception and harmony.

Raw materials such as oak, bittersweet oak, and chestnut represented 15% of the furniture. These woods are favored for their warmth and environmentally friendly qualities. Additionally, furniture and colors—which are essential for improving design comfort and ergonomics—accounted for 12%. Water features also fall within this category, as they not only provide a calming effect but also help purify the air and reduce stress. Marble and stone were represented at 8% and 5%, respectively, adding a touch of luxury to the ambiance of the spaces. Lastly, bricks comprise only 5% of the materials, but they are valued not only for their appearance but also for their heat resistance.

These percentages are approximate and reflect the emphasis placed on each material concerning biophilia and the sustainability of the built environment. Each element plays a significant role in developing a healthy, non-toxic environment. A quantitative and visual representation of the material choices is provided in Figure 4, where greenery, lighting, and raw wood stand out as the main contributors to biophilic integration in design.

Figure (4): Selection distribution of the material used (greenery, wood, lighting).



Assessment Criteria: Each of the projects of the students were evaluated with the following criteria by means of structured rubric: Natural lighting and ventilation is employed. Use of green, water or organic forms. Material authenticity (raw materials or local materials), ecological or organically inspired spatial arrangement, sense impression (color, texture, temperature, acoustics) The rating was performed with 5-point Likert scale (Wang et al. 2024), and quantification of the result was performed with weighted average marking:

$$\text{Weighted Average Scoring} = \frac{(\text{Score} \times \text{Frequency})}{\sum(\text{Frequency})}$$

Visual and Spatial Quality: The combination of the biophilic elements in various projects has been depicted in Figures 1-3. There were elements of intentional sounds of oneness in between built and natural sceneries in all designs. These examples proved the capability of students to transform theoretical concepts into reality and even sensory-rich spaces.

Usage of Material: Table 1 and figure 4 showed the pattern of utilization of common material used in the biophilic, namely glass, wood, greenery, stone, and water feature, in terms of their aesthetic, ecological,

and sensory benefits. It was indicated in the analysis that there was a significant inclination toward aspects that enhanced the quality of air, acoustics, thermal comfort, and ritualistic stimulus.

In sum, the findings allow us to assess that it is highly likely that the biophilic design approaches play an important role in helping interior design students to engage creatively, experience positive emotions, and think sustainably.

Discussion

This research aligns existing literature (Yildirim et al., 2023; Zhong et al., 2022; Obeidat et al., 2024) and demonstrates that biophilic integration enhances both well-being and educational creativity. Unlike previous research focused primarily on workplaces or healthcare settings, this study provides one of the first empirical confirmations of biophilic design pedagogy in higher education. It contributes to knowledge by framing biophilic design as a transformative educational paradigm rather than a stylistic trend.

Interpretation of Results

The findings provide compelling evidence that biophilic design effectively enhances the educational experience in interior design programs. The strong correlation between biophilic elements and increased creativity aligns with earlier reports by Browning and Ryan (2020), which confirmed that exposure to natural elements stimulates creative thinking, mental stability, and design innovation. Additionally, the enhanced emotional well-being observed among students supports psychological research on the restorative and motivational qualities of nature-enriched environments.

These results extend previous studies (Yildirim et al., 2023; Zhong et al., 2022) by demonstrating that biophilic pedagogy fosters not only creativity and

well-being but also long-term ecological consciousness within higher education settings. This positions biophilic design as a pedagogical transformation rather than a passing trend, establishing it as a paradigm-shifting educational approach with measurable impacts on student outcomes.

Comparison with Previous Studies

This study contributes to current literature by demonstrating that biophilic design principles can be successfully integrated into academic design assignments. Like outcomes documented in workplace and healthcare design research (Yildirim et al., 2023; Zhong et al., 2022), the educational setting yielded quantifiable improvements in creativity and sustainability awareness. However, this study is distinctive in its pedagogical focus, providing empirical evidence on how biophilic design cultivates environmentally conscious and emotionally intelligent future designers.

Students who incorporated natural forms, raw materials, and daylighting demonstrated heightened empathy and ethical awareness, confirming the pedagogical value of nature-based design practices. Faculty interviews revealed that students engaged with biophilic design exhibited greater involvement, reflective capacity, and human-centered approaches in their work.

These findings establish that biophilic design transcends stylistic trends to function as a comprehensive pedagogical approach that can fundamentally enhance design education. The connection between multisensory, ecologically grounded design and sustainable thinking provides strong justification for institutionalizing biophilic principles within studio-based learning environments.

Theoretical and Practical Implications

The study adds to existing theories on biophilic design, particularly biophilia theory and concepts from environmental psychology. It validates theoretical models that suggest cognitive and emotional benefits arise from interactions between humans and nature. The study demonstrates how elements of natural design influence outcomes in creativity, well-being, and sustainability awareness among students, using empirical evidence. Furthermore, the findings highlight the educational aspect of biophilic theory, indicating that its principles cannot only be applied in professional design practices but are also crucial for shaping future design thinking through education. This perspective positions biophilic design as a thoughtful practice and teaching approach that fosters environmentally friendly innovations (Paradita et al., 2024).

The research also provides valuable insights for curriculum developers, educators, and policymakers in educational institutions, offering practical suggestions and information. Incorporating biophilic elements into studio courses can enhance student performance, participation, and ethical awareness. Experiential learning can be effectively supported using well-organized tools such as biophilic rubrics, sensory design prompts, and interdisciplinary case studies developed by design instructors. Educational leaders and practitioners are encouraged to create learning environments that reflect biophilic principles by incorporating natural light, organic materials, and immersive green spaces (Terblanche and Khumalo, 2024).

Additionally, pedagogy within the field of interior design must also relate to Sustainable Development Goals (SDGs) since it would transform the work of students into more important and helpful to society. Specifically, as the study reveals, the implementation of such a strategy as design biophysically can benefit

the following:

- SDG 3 (Good Health and Well-being) by reducing the stress load using psychological comfort provision.
- SDG 4 (Quality Education) in the learning and reflection process.
- SDG 11 (Sustainable Cities and Communities) with the help of urban and community mindful ground plans.
- SDG 12 (Responsible Consumption and Production) is based on the following premise: on consumption of sustainable material (as well as of locally sourced material) (Browning & Determan, 2024; Miliken, 2023).

Overall, the study helps create the mission-based dual-purposed institutionalization of the principles of biophilic design as the driving force not only to increase the quality of interior design education but also educate the students on the role of the environmental and social change agent (Ebbini, 2022). The examples students have developed in three graduation projects, and what the present research paper has made available, are that the biophilic design could be integrated into the interior architecture of the buildings to a large extent. The students had been denied the perspective that it was technical monitoring but philosophy. This has been achieved through the green walls, daylight-based fenestration, eco-furniture, and natural texture that have assisted in the development of health boosting spaces through which they have impacted the effect and contact with nature (Shiawi and Zahrah, 2023).

This work experience created some degree of environmental awareness among students, and they gained a more profound knowledge of the potential that opportunity design holds towards building healthy and sustainable lives. According to the observations conducted on instructors, the students happened to be

more driven, innovative, and dedicated to adhering to bio philia values.

The provided observations suggest that biophilic design may also be a significant didactic method, in addition to supporting the holistic learning possibility, it will promote ecological thinking in the field of interior architecture (Shaikh, 2023). With the help of interdisciplinary education, it could be even more influential to academic and professional practice through additional integration into the studio curriculum.

Conclusion and Future Work

This research confirms that incorporating an educational aspect of biophilic design into interior design has a considerable positive impact on the creativity of the students, their emotional health, and their environmental awareness about sustainable design. The review of the student graduation projects showed the contribution of attributes like natural light, greenery, water features, and raw materials as a part of making the quality of design output, as well as enhancing the understanding of the students about their interaction with nature. The design interventions aided students in thinking of spaces that are restorative in nature and responsive to the environment.

The research results also show how biophilic design prompts students to rearrange their ideas on what is important about designs using the perspective of environmental ethics and of human-centered design. Through biophilia, the students were inspired by Wilson on a biophilia hypothesis (Barbiero, 2023), and through design applications, the concept became a reality, encouraging living contexts by promoting healthier ways in cities and interiors. Students performed on a technical level, developed ecological awareness, and rediscovered their desire to design as future professionals with the welfare of people in mind.

In addition, the research highlights the importance of biophilic design as a means of educating the future generation of designers, those able to achieve a sustainable world in keeping with global sustainability aims, but harnessed to ensure human health, emotional equilibrium, and creativity. Nature-based strategies included in the study curricula help in facilitating easier cognitive shifts, creative thinking, and social responsibility among the students. Biophilic design can therefore be seen not only as a trend but as a complete approach to education, which would put students in the role of active actors of life, leading to a more sustainable and livable environment.

Future Work

Besides being institutionalized and having scale effects, six recommendations would be given as follows in terms of the biophilic design being applied in the education sector for future work:

1. Curriculum Integrations: Developing biophilic planning into the curriculum as a design of study. This must include special modules, project-learning, and cross-disciplinary case studies that would plunge the students into the dilemma of real environment and spatial matters.
2. Faculty Development: Refer to the lecturers' trainings and documents that can help them to perfect the process of their teaching, management, and assessment of the biophilic design undertakings. There should be the redrawing of pedagogic instruments and introductions to research and even good practice in the designing of the environment should be made with the selection of faculty development programs.
3. Design Evaluation Tools: Development of evaluation rubrics, which will enable rated treatment of the aspects of biophilic design in works of the students. They are meant to carry about sensorial needs,

quality of space, sustainability and well-being of the user.

4. Cross Disciplinary Collaboration: Assist in the arrangement of inter-departmental collaboration in program on architecture, sustainability, health sciences and environmental psychology. This may result in the multicultural nature of the experience of learning and more applicable product of the design.

5. Youth and Community Engagement: There is a need to come up with extracurricular or community service that could enable the students to discover how far they can apply the concept of biophilic principles in the big world. The service making and doing help to generate environmental awareness and social responsibility.

6. Prolongation into the Future: As a plan, it was to be extended further by using the cross-institutional and international contingent case surveys through which the results could be tested and compared when disseminating the various ecological and cultural environments in the process.

In conclusion, biophilic design presents the dilemma of teaching and learning in the transformational dimensions. The facilities would be in a better position for offering environmentally and health-conscious designers in the interior design curricula that will turn out to be of added value in the interior design of new, sustainable, and comfortable environment to human beings.

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