

# Towards Greener Interiors: Sustainable Materials and Design Innovation in Contemporary Spaces

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**Abstract:** *Interior design is a critical factor that affects human well-being and environmental sustainability. However, the long-term effects of interior design on the environment are often underestimated. As people spend a considerable part of their lives indoors, interior spaces have a major contribution to energy consumption. Darbuna Restaurant in Baghdad, and Green School Bali in Bali, are used as case study to examine sustainable interior design. This study will examine the use of rapidly renewable interior materials, including bamboo, as an alternative to slow-growth timbers. Moreover, the use of recycled interior materials will be discussed as a means of conserving resources. Finally, this study will examine the use of interior plants to clean indoor air and natural ventilation systems to reduce electricity consumption. Based on the findings of this study, it is evident that sustainability and design quality are not exclusive; they can be integrated to create a quality interior environment.*

**Keywords:** eco-friendly materials, environmental aesthetics, biophilic design, green building, sustainable interior design.

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## INTRODUCTION

The interiors of buildings are not often discussed in terms of the health of the planet, yet they consume a considerable amount of resources. Each year, a tremendous amount of material is used to manufacture the floors, walls, ceilings, and various materials used in the building. Studies conducted by Alfuraty (2020) indicate that 50% of all the materials extracted from the earth are used in the construction of the interiors. The problem is further complicated by the need to use energy to warm, ventilate, light, and cool the interiors. The decisions made during the designing of the interiors affect the environment and the lives of

others significantly. The primary concern in the past was the beauty and functionality of the space. However, recent developments and discoveries have led to a change of heart, and the focus is now on the health of Planet Earth. Therefore, the choice of colors, furniture, and designs must be made with the health of Planet Earth in mind. The focus has shifted from causing damage to creating a space that is healthy, has good air quality, and is comfortable. The decisions made today must be forward-thinking and sustainable.

Through the study of Sofiana & Fajarwati (2018), one of the key concepts that emerge is that of green interiors, but this is not merely the substitution of traditional materials with green materials. A more encompassing view of the concept of green interiors is the combination of the elements of energy conservation, waste reduction, equity, and cost. Materials, particularly green materials, are of the utmost importance. Buildings that have the potential for longevity or flexibility are classified under the category of green interiors. The concept of forward thinking, or the understanding of the potential for reuse or dis-assembling of elements, is also beneficial.

Although there is a current trend towards environmentally friendly designs, the way ahead has been clouded by factors such as a lack of familiarity with natural materials, increased costs, and outdated design aesthetics. The study being presented here illustrates the potential for spaces to be ecologically responsible without having to compromise on aesthetics. A review of materials, space planning, and difficulties illustrates areas for improvement. The concepts that are being introduced now will allow for more informed decisions in the future.

## **LITERATURE REVIEW**

Living in a sustainable space requires forward thinking. Forward thinking requires that you consider how the present will affect the future. Forward thinking has three strands that are interconnected like the roots of a plant that go deep into the earth. These three strands include environmental sustainability, social responsibility, and economic efficiency. All our decisions are interconnected, like the decision on material or space. The pleasantries of the present must not affect the future. The decisions made in a space impact the environment more than one can imagine. The resources used come from somewhere, so cutting down on resources means saving forests, rivers, and lives. The process of production requires an action chain like digging, building, and moving, which impacts the earth and atmosphere. The quality of air inside a room is as important as that outside.

What are environmentally friendly materials? Sofiana and Fajarwati (2018) defined the definition of environmentally friendly materials. According to the definition, environmentally friendly materials play a crucial role in providing a function without the emission of harmful substances during manufacturing or use. Moreover, the materials must be able to withstand pressure over time. After use, they must be able to biodegrade or be recycled. Finally, the use of local resources is important, as it will help reduce fuel consumption and increase employment. The approach can take the following form: reduce, reuse, reshape, and the integration of renewable flow. This concept is based on a cradle-to-grave model that McDonough and Braungart (2022) proposed. It is a paradigm that encourages a change from conventional manufacturing practices. These practices involve the manufacturing of products that can easily go to

waste. However, products that are manufactured based on this concept can easily go back to nature without causing harm or can be reincarnated within industrial processes. Thus, a number of designers are now using materials that can function within such a cycle, as noted by Hartini et al. (2020).

## **METHODOLOGY**

This study employed a qualitative case study approach to investigate sustainable interior design practices. Two interior design case studies were chosen: Darbuna Restaurant in Baghdad and the Green School Bali interior design project. These case studies were chosen because they incorporate sustainable interior design practices in their design processes. This study focused on three important aspects of sustainability in interior design: the use of rapidly renewable materials like bamboo, recycled interior design materials, and natural environmental design strategies like interior plants and natural ventilation systems. In this study, the case study projects were analyzed to determine how they contribute to the reduction of environmental impacts, enhancement of indoor environmental quality, and reduction of energy consumption. A comparative analysis was done to determine the similarities between the sustainable interior design principles employed in both case study projects.

## **RESULTS AND FINDINGS**

### **Natural and Renewable Materials**

The role of natural materials in the design of well-thought-out spaces within the indoor environment should not be underestimated. For example, natural materials offer a sense of touch that is soft. Furthermore, the natural beauty of the materials offers a sense of visual fascination. A natural material that can be used in the design of the indoor environment is bamboo. This is because it takes a relatively shorter time to mature to a period of three to five years. This is compared to trees that take decades to mature to the height of mature bamboo. Furthermore, the fact that it is less prone to infestation by insects ensures that it lasts longer than wood. Green School in Bali is a good example of the application of bamboo in the creation of the indoor environment. This is because it has been used in the construction of walls, seats, floors, and even artistic features. The Bamboo framework is used to create light-filled spaces that transcend the division between interior and exterior spaces, thus promoting natural ventilation and lighting while minimizing artificial cooling and lighting. The abundance of bamboo in Bali is helping to make it feasible to integrate the concept of green buildings with innovative ideas. Green building concepts are being successfully integrated into interior spaces with innovative ideas at Green School Bali.

Wood can be used in creating the interior environment after cutting trees. However, the wood used should be obtained from well-managed forests. Such wood would show commitment to harmonious coexistence with the environment. Alternatively, wood obtained from unused crates would be used in creating interior environments without cutting trees. The textures obtained after natural exposure give wood special characteristics that cannot be obtained by new wood. As Hartini (2020) elucidated, "Bamboo furniture or burlap rugs, for instance, can be used to improve the eco-friendly interior decor of a data center. Rattan, hemp, jute, and sisal are often used in eco-friendly designs. Working with these materials requires less electrical power compared to synthetic materials. Additionally, they are biodegradable, hence reducing

environmental pollution after they are discarded. These materials are locally sourced, hence promoting employment and reducing fuel consumption for transportation.”

### **Recycled and Upcycled Materials**

Old materials get a second life when they are reused for a specific function. Recycling old materials like paper, glass, and plastic is helpful for managing wastes. When old materials get a second life, they normally get more value than before. This method does not include discarding but rather acquiring more value than before, as opposed to creating new materials. Hence this assists in reducing excavation by reusing old materials rather than being discarded in landfills (Alfuraty, 2020).

This approach does not eliminate the old in order to make the new, but it makes the old into a whole. It has an aesthetic value that relies on the use of old materials and not discarding them. It also has a peaceful reverence that permeates the environment where functionality and emotional value are achieved. The old and lost are gradually assimilated into the new. New designs are achieved by incorporating recycled materials, which are a combination of farm waste and fungi, creating a rich substrate for low division and sound reduction. A combination of lime and hemp creates an insulating material that has a low cost of production. It also has the potential for incorporating ash from power stations and cement.

### **Energy-Efficient Interior Design Strategies**

In a closed environment, the level of energy consumption has a direct relationship with the decisions made regarding the ventilation, lighting, and the incorporation of devices within the walls. Having open windows will allow the free circulation of fresh air within the structure, thereby reducing the level of energy consumption for cooling. By taking a cue from nature, as described by Attia (2015), the structure with vents or openings will serve as the skin for an animal, responding to changes in temperature, wind, or humidity. This type of structure will function well even without the use of a motor or wiring. Having natural sunlight will reduce the level of electrical energy consumption. By strategically placing the windows, the natural light will penetrate deeper into the structure, thereby reducing the need for artificial lighting. Glass will serve as an alternative for solid walls.

Light color flooring materials and ceiling finishes have a greater tendency to reflect rather than absorb light. Moreover, if artificial light is needed, LED lights will be the most suitable option due to their durability, efficiency, and natural light as opposed to other options like fluorescent or incandescent light. Solar-powered lights will also reduce energy consumption. Other features include water-saving devices. Technologies that are at the cutting edge include sensors that change according to ambient changes due to usage patterns. High-efficiency heaters and coolers will also reduce energy consumption. Even though all these options have different advantages, when they are put into use collectively, they will provide a greater efficiency outcome. Such a building design will have a positive impact on energy efficiency, hence improving comfort.

### **Design Principles and Spatial Strategies**

Indoor plants provide comfort for the mind through designs that resemble forests and rivers. The environments created from wood, stone, and bamboo provide conditions for focused minds. In some environments, it is not the walls that provide boundaries for indoor and outdoor spaces, but the air and the

sun. In Bali, a school has created classrooms without cornered walls for the sake of efficiency in the airflow between desks and texts. The use of nature has influenced all the environments, including their functionality and beauty.

The environments are more functional when used for a longer period of time. The large-scale designs eliminate walkways, and multi-dimensional environments are easily adaptable to different needs. The furniture is easily moved, similar to flexible rather than stiff building designs. Nature affects all aspects of the environments, including their aesthetic and functionality. Nature affects all aspects of the environments, including their aesthetic and functionality. Environments are more functional when used for an extended period of time. Large-scale designs eliminate walkways, and multi-dimensional environments are easily adaptable to different needs.

This implies that there is less reconstruction, and the interior designs are intact for a longer period of time. Therefore, they are useful for a longer period of time, year after year (Alfuraty, 2020). This implies that the traditional construction methods are becoming more and more adaptable to the changes in the environment. For example, "Darbuna Restaurant" of Baghdad. The building is made of reeds and soil, as this is suitable for the environment in Iraq, where the restaurant is located. The materials used in this building, reeds and soil, assist in cooling or warming the interior of the building. The porous nature of these materials enables air to pass through the space, thus helping to regulate the interior temperature. Therefore, this is a clear example of how interior design in a building, such as Darbuna Restaurant, incorporates elements that are environmentally friendly.

## **DISCUSSIONS**

The objective of this study was to examine the practice of sustainable interior design by using the literature available between 2015 and 2022, the performance of the materials, and the case studies of Bali and Iraq, highlighting the importance of evaluating the influence of the selection of materials, space planning, ventilation systems, and the use of biophyll elements on energy efficiency, environmental sustainability, and human well-being.

The study has shown that Bamboo and other resources have a high regeneration potential compared to hardwood materials, which have less potential in terms of sustainability. Recycled tiles have a high potential in terms of sustainability, which can result in the reduction of waste while providing competitive performance and diversity in terms of aesthetics. The use of natural ventilation and daylighting has shown a positive influence in the reduction of electricity consumption, which can be measured, particularly in temperate and mixed climates, in the early stages of interior design planning. The use of plants has shown a positive influence in terms of the perceived quality of air, thermal, and psychological well-being, thus supporting the importance of using biophyll elements in the practice of interior design.

Despite this, there are tangible challenges associated with green interior designs despite the apparent advantages. The first challenge associated with green interior designs is that the designers of the green space may not have a thorough understanding of the ecological materials and the means of implementing them (Srivastava & Bhatnagar, 2017). This means that they will resort to the familiar, and the existing

knowledge will thus dominate by default. It is hard to find individuals who have not factored the cost aspect of going green. In the beginning, going green is expensive because the materials are scarce or hard to procure. However, in the long run, it is cheaper since it is long-lasting, needs fewer repairs, and is environmentally friendly (Alfuraty, 2020). The first challenge associated with green interior designs is the availability of materials, especially when the environmentally friendly ones are scarce (Hayles, 2015). The aesthetics of the green space can also be a challenge, although research has shown that it can be very ornamental and have character (Zhong et al., 2022).

## **IMPLICATION TO RESEARCH**

The contribution of this study to the field of sustainable interior design is substantial, as it indicates that it is possible to incorporate environmental sustainability with aesthetic and functional design quality. It also points to the significance of using rapidly renewable resources, recycled resources, and passive environmental strategies in minimizing the footprint of interior spaces on the environment. Such a study could be useful in guiding designers, architects, and educators in embracing more sustainable practices in interior spaces. It also points to the potential of interior design in enhancing human well-being while promoting a culture of environmental sustainability, especially in interior spaces where people spend a considerable portion of their time indoors.

## **CONCLUSION**

It is clear that this is no longer a choice between environmental responsibility and beauty, but rather a harmonious result of good design. Green interior design creates new textures, warmth, and meaning, thereby enhancing the value of aesthetics. Moreover, it has the potential of enhancing the value of functionality with technology that saves energy. The creation of sustainable practices is a process that requires education, cooperation, and communication with clients. The focus of interior design research in the future will be performance measurement, user experience, and local strategies. With the growing concern for environmental issues, there is an opportunity for interior designers to create harmonious and meaningful interior spaces that integrate human needs with environmental constraints, as creativity meets sustainability.

## **FUTURE RESEARCH**

Future research directions for this study may include the exploration of more sustainable interior design projects. Quantitative research methods may be employed to assess the actual energy savings, indoor environmental quality, and well-being benefits of sustainable interior design strategies. Other research directions may include the exploration of more innovative sustainable materials, environmental technologies, and biophilia-based interior design strategies for improving the environmental performance of interior spaces. Moreover, exploring the users' perceptions of sustainable interior spaces may provide more insights into the long-term effectiveness of sustainable interior design strategies.

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