

Integrative relationship between environmental Architecture and interior design towards sustainability

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Abstract

Sustainable design is a global trend that concerns governments and international organizations interested in preserving the environment and its natural resources. The research is intended to clarify the concept of sustainability and its role in architecture and interior design and how to create integration and harmony between interior architecture, outdoor and the environment. Therefore, the design process requires from the designer to balance between the values of the technical formation and the aesthetic, so the extent of the relationship to the environment and it's Integration with it. The designer must take advantage of environmental characteristics to integrate functional and aesthetic visions to create flexible designs to achieve harmony and unity between interior architecture and environmental vocabulary. The important issue is the integration of technological and ecological sciences to minimize the negative impacts on the environment to achieve the integrative relationship between environmental architecture and interior design towards sustainability.

The research addresses the concepts and principles of sustainability of the integrative relationship between environmental architecture and interior design, to emphasize the importance of inspiration from the local environment and traditional architecture to link the benefits of environmental, economic and innovative applications concepts of sustainable and green architecture, for employing them in modern buildings and meet the needs of the adapts to the current era by uses scientific and technological progress in the construction and interior and outdoor design of architecture compatible with the environment.

Keywords

Integrative, Environmental Architecture, Interior Design, Sustainability

Introduction

The integrative relationship between environmental architecture and interior design aims to preserve the environment and reduce the negative effects of pollution and visual distortion, through the application of environmental concepts and sciences such as sustainable design and green architecture that regulate the relationship between buildings and the environment, respecting the right of future generations to a healthy life, and working to protect the environment. Optimizing natural resources, reducing energy consumption and relying more on clean, renewable energy sources.

Hence the importance of embedding the concept of environmental architecture in designing modern buildings internally and externally in a manner that respects the surrounding environment and its characteristics and adapts to natural conditions, functionally and aesthetically,

by adopting environmental sustainability methods that depend on the ecological aspects and the application of modernization techniques in the field of technology.

Dealing with design inputs aiming to place environmental considerations at its top priority. The research presents various models of solutions and alternatives used in modern buildings, which have been applied in architecture and interior design to achieve sustainability.

Research problem:

- Lack of awareness of the important role of architecture and interior design in solving environmental crises, and ensuring the sustainability of natural resources.
- Due to the increasing urban growth caused by the pollution of the environment with all its elements, and due to the loss of the communication link between both the interior design and the cultural features of the place, it has become necessary to find design solutions that have an integrative relationship with the environment.
- The lack of structured databases that help in applying the concept of sustainability, including research, analysis, inclusion of knowledge in the creativity process, and the integration between environmental design and interior design.

Defining sustainability:

It is the fulfillment of the needs of the present without compromising the ability of future generations to meet their needs.

Environmental Economics:

Economics is concerned with environmental issues and examines the interrelationship between the human economy and ecosystems and natural resources, and relies on finding ways to reduce resource consumption and treat nature and resources in general economically.

Sustainable development:

It is the economic activity that leads to the improvement of social welfare with the greatest concern for the available natural resources and the least possible damage to the environment

Sustainable design:

Sustainable design centers on two main axes

1. Preserving the environment and natural resources.
2. Ensuring the future of future generations.

The designer must plan to reach the optimal design that achieves the integrative relationship between environmental architecture and interior design in the direction of sustainability through preserving the environment and natural resources to ensure the future of future generations.

In order to reach sustainable design, important criteria must be met, which is that this design be ethical, impactful on the environment, and innovative, as well as achieve beauty and be original and competitive in the future.

Solutions and alternatives that achieve sustainability in architecture and interior design:

1. Using alternatives to natural resources represented in raw materials and energy:

Raw materials: Usually environmental resource recycling, reuse, alternatives to natural materials.

Energy: energy efficiency, and the use of alternative energies in the operation of the building.

2. Using ecological methods in operating sustainable building: The culture of environmental conservation, knowledge of the product cycle and waste recycling to obtain new products and preserve energy sources for future generations has become one of the most prominent issues in the fields of design and the environment. And designers working on the principle of sustainability depend on the use of environmentally friendly materials, processing and using recycled materials, and working to extend the useful life of the final product to solve many problems, especially electricity and energy, and reduce the percentage of environmental damage. Experts stress the importance of using sustainable raw materials and paying attention to environmental issues such as the impact of global warming, the increase in the amount of waste and the limited resources based on natural sources.

3. Classification of materials that achieve sustainability in sustainable architecture and interior design: “Eco-Friendly Materials”: - Eco-friendly materials Environmentally friendly materials are known as raw materials whose extraction, manufacture or use does not harm the human being or the surrounding environment, so the designer always seeks to adapt to the surrounding environmental condition through the appropriate selection of materials compatible with the external environment, environment friendly materials do not contribute to the pollution Because they are often natural materials, and an example of environmentally friendly materials is natural bamboo, which is widely used in the field of interior design and furniture.

Recyclable Materials:

They are the raw materials that are manufactured by crushing some of the wastes of previously used raw materials, after cleaning them and recycling them again. One of the most recyclable materials in the field of interior design and furniture is glass, aluminum, and paper, and there are international companies specializing in recycling these materials to obtain innovative products

Ecological concept:

It is the science concerned with the relationships between living organisms and the physical environment, or the surrounding environment in which materials and energy are exchanged, forming an ecosystem.

Models of modern architecture that applied the thought of sustainability:

The research presents some varied models of solutions and alternatives used in modern buildings that are environmentally designed according to the trends of sustainable environmental design, and the different ways of applying them in architecture and interior design through an analysis of some elements of interior design and furniture to achieve sustainability.

The first model: the use of solar energy systems and technological bases in designing the internal spaces of the building, and achieving visual extension with the external environment to allow viewing the outside landscape, and taking advantage of the natural lighting, which is a permanent building for display and holding, Leonardo Glass Cube through the glass facades of the Leonardo glass cube in Bad Dyberg, Germany, 2007.

deluxe meetings and hosting designed by the three deluxe office
The building is one of the design solutions that provide light comfort to the interior spaces and achieve the requirements of sustainable development as lighting is considered one of the important natural factors that affect the comfort and efficiency of the human being inside the architectural void, which must be available in the degree and efficiency that enables the person to Carry out its work easily and easily inside the blanks. Which the interior designer must try to make the most of the natural lighting and try to penetrate it inside by using different design methods.

The building has an integral concept that blends architecture and interior design in an aesthetic unity, as the building is a cubic and has a glass façade to achieve visual extension with the external surroundings to allow viewing the exterior landscape even for those who are in the depth of the building from the inside, and the designer tried to take advantage of the natural lighting through the penetration of light inside Building through glass facades and providing for the use of industrial lighting, thus achieving the economic and environmental dimension that sustainable design requires.

The building has a distinctive environmental character, as it combines between solar energy systems and technological bases in designing its interior spaces, which is a polyvinyl butyral PVB resin. Techniques and glass treatments have been used with butyral polyvinylchloride, which gives a strong envelope, transparency, durability, and flexibility. The roof design also represents the most important ecosystem within the building by shaping it using joints as a ventilation system.

The design of the multifunctional building's open plan allowed an integrative relationship between exhibition areas, meeting and seminar rooms and working spaces. We find that the interior space of the exhibition consists of a space block, through which bridges are visible that connect the upper floor and the ground floor, providing a wide visual field for the main display space on the ground floor.

The second model: Barin The use of smart ecological architecture and bio-climate architecture in the design of **Barin Ski Resort in Tehran - Iran in 2008 “RYRA Studio”** designed by Studio Rera, “Ski Resort” Barin Ski Resort is one of the modern projects that was able to achieve harmony and communication between space The interior and its components "RYRA Studio", the architecture and the surrounding environment, simply and innovatively. The designer, Studio Rera, was inspired by the idea from Eskimo houses, and he wanted to communicate between the building and the nature of

the place that enjoys dazzling landscapes, so he drew his inspiration from the topography and the nature of the area, which represent layers and blocks of ice, which is the main feature of the region, along with the contoured mountainous lines. By successfully integrating it into all of the architecture, interior design and furniture made of stone. This model expresses the unleashing of architectural creativity inside and outside the building in terms of its integration and compatibility with the environment, and the performance of innovative and unique designs to reach these pure and integrated spaces that came like snow covering the lands of the region that sits on their land.

The third model: the use of turbines and their circulation by wind to generate energy: The Bahrain World Trade Center was designed using three turbines built and installed by the Danish company, Norwin, which is the world's leading specialist in building integrated wind turbines for many years of experience, especially the NORWIN Bahrain World Trade Center project. Three Norwegian 29-Stal-225 KW turbines were installed on three bridges between two sky sweepers. This task posed tremendous challenges to the Norwegian engineering team, and yet it was able to successfully install the turbines. Now the entire building with wind turbines is a well-known landmark around.

The fourth model: using solar energy as an energy alternative to develop the Vatican building as an ecological building powered by solar energy:

The Vatican is trying to catch up with ecological cities, so the idea of using solar energy as a substitute for energy within religious buildings in the Vatican came about, and as a response to the call for a return to nature and a trend to theories of internal balance in the use of energy in various internal spaces, and as an attempt to confront the various environmental threats facing the world. This step came as the beginning of the general trend towards an ideal eco-city.

The equivalent of 2,400 photovoltaic panels were installed on an area of 5,000 square meters of the ceiling of the hall where the papal abode, and thus the Vatican was the first ecological building in religion.

The roof was designed by the architect / Pierre Luigi, as the concrete roof needed to be replaced, so he replaced it with solar energy and technology, SMA & solar world architecture with solar panels, donated by German companies, and these panels are expected to produce about 300 megawatt hours of energy per year. Which is sufficient for lighting, heating and cooling GREEN ARCHITECTURE Fifth Model Green architecture is a functional building system compatible with its biological environment and its ecological scope with the least negative impacts on the environment and energy consumption, thus achieving the efficiency of the performance of functions and activities in an innovative architectural style. He called it this name to signify compatibility with the environment, as green architecture borrows the properties of plants to integrate with the environment. And it works to reduce the temperature through the group of natural plants planted in it to contribute to cooling the structural envelope, as it works in turn to achieve the desired shade according to the building orientation.

The use of green roofs on a large scale may alleviate some of the problems of modern cities, as it reduces rainwater runoff in the streets and purifies rain water from the pollutants stuck in them. Green roofs also reduce energy consumption.

Buildings with green roofs need less heating in winter and less cooling in summer than buildings with traditional roofs.

In Singapore, one of the best examples of "nanyang" is the building of the College of Art, Design and Media at Nanyang Technological University, where the building was awarded the Green Mark Platinum Award from the Building and Construction Authority in Singapore for adopting best practices in the field of environmental sustainability in May 2011.

One of the main achievements of the building is energy and water savings, which results in lower operating and maintenance costs.

Consisting of 5 floors and completely covered with green roofs, "Pte Ltd", the building designed by the curved Pte Ltd, is an architectural masterpiece because it is a combination of landscapes and superior technology that symbolizes the creativity of the designer.

The main feature of the building's design is the green roof, sloping slopes at an angle of approximately 45 degrees. The roof of the building can be accessed by the stairs on the sides of the curve. Grass covers the roof of the building and is kept throughout the year through an automatic sprinkler system using collected rainwater.

Results:

- 1.** To reach a sustainable design, there must be full integration between architecture and interior design and each of the electrical, mechanical and structural complementary engineering specialties.
- 2.** Achieving a balanced building with an integrative design is achieved through the integration of the building and its internal operating systems with the ecosystems in nature.
- 3.** The development of the efficiency of the internal environment of the buildings has a great impact on reducing the consumption of resources and improving the services required according to the Energy Leadership and Environmental Design assessment system.
- 4.** Applying the concept of sustainable design effectively contributes to achieving a balance between the needs of the building users and the requirements for preserving the environment.

5. Although there are several trends of environmental design that ultimately lead to the same goal, which is to preserve the natural environment on the ground, it does not lead to a specific unified style.
6. The trend towards sustainability is an integrative relationship between architecture and interior design aimed at achieving a thermally and visually comfortable environment, achieving both the functional and aesthetic aspect.

Recommendations:

1. Integration of technological and ecological sciences to reduce the negative impacts on the environment and achieve the complementary relationship between environmental architecture and interior design towards sustainability.
2. Finding an integrative relationship between environmental architecture and interior design that contributes to preserving the environment, minimizing the negative effects of pollution and eliminating visual distortion, thus achieving sustainability.
3. Applying the concept of sustainability in the field of architecture and interior design and creating a multi-dimensional design language that achieves aesthetic and creative values in crafting the inner space.
4. Inviting architects and designers to deal with the environment in a more balanced way, and to search for design alternatives by making use of natural and renewable energy sources.

5. The designer must take advantage of the environmental characteristics to integrate functional and aesthetic visions to create flexible designs, which achieve harmony and unity between architecture and interior design in the direction of sustainability.
6. The cooperation of all disciplines participating in the design process for sustainable buildings in the initial stages to take design decisions that are in line with environmental requirements to ensure the achievement of sustainable development requirements.
7. Directing designers' attention towards the necessity of applying environmental design globally and locally, especially in Egypt, due to the nature of the current stage of the advancement of Egypt and its global reach to face the challenges that hinder achieving sustainable development.

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