

## تأثير التكنولوجيا الحديثة في توظيف الخامات البديلة في مفردات العمارة الداخلية

# The Effect of Modern Technology in Employing Alternative Materials in Interior Architecture Vocabulary

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### Introduction:

A person spends more than 90% of his time in the interior spaces of buildings, and this percentage is higher for children and women than for men. The widespread technological development in various areas of life and the use of modern technological materials has led to the development of form and function. This was often done without taking into account the standards for materials and the extent of radiation of these materials or their impact on the internal environment of humans.

Studies by the US Environmental Protection Agency have proven that the concentration of indoor environmental pollutants is approximately two to five times higher than their concentration levels in the outdoor air, under normal circumstances. However, in the case of some indoor activities, such as performing maintenance using chemicals, the percentage doubles to a hundred times from the outside, and since breathing is a necessary and involuntary process, the rate of exposure to pollutants in indoor spaces is very high.

The environment is a system that includes all natural and living elements, in addition to human beings with their different cultures and social relationships, and the importance of interaction between those cultures and relationships. The concept of sustainable design does not mean planning a natural indoor environment only, but also a major part of it depends on calculating the electrical energy consumed and production of polluting gases. The design remains incomplete until... A suitable green interior is laid out.

### Research problem:

- Neglecting the criterion standards for raw materials, their extent of radiation, and their impact on the internal environment of humans.
- Lack of interest in using developed or recycled natural materials to maintain the integrity of the internal space.

### Research importance:

Developing the interior designer's knowledge of technologically advanced and recycled natural materials for use in interior design work.

### The aim of the research:

- Taking advantage of sustainable design standards to create an environmentally friendly building.
- Emphasizing the role of technology in developing the concept of recycling and developing the nature of raw materials in interior design work.
- Encouraging the use of developed and recycled natural materials in interior design work.

**Search limits:**

**Objective limits:** emphasizing the role of technology in developing the nature of recycled materials and materials and their use in interior design work.

**- Spatial boundaries:**

- Temporal limits: represented by the development of the role of technology in developing raw materials from the beginning of the third millennium until now.

**Research Methodology:**

A descriptive, analytical, inductive approach to the principles of sustainability and technology and their application in interior space design work.

**Key words:**

Green interior design - modern technology - alternative materials - environmental thought - technological environmental architecture.

**Engineering and environmental thought:**

“Environmental engineering aims to take care of everything that would ensure the safety of the environment, and pay attention to the means of preserving this safety to provide a healthy environment for humans with the aim of preserving their humanity.” (11) “Environmental architecture is architecture that appeared from ancient times, and its results varied from one region to another, and it is the goal of construction, it is an attempt to adapt to the surrounding environment simply to protect oneself from it. This type of architecture has different styles that change according to environmental factors, available resources, and limited technologies at that time.” (2, page 28) “The technological development and huge industrial growth in the late sixties and the early seventies, there was an adverse impact on the environment, and many environmental problems appeared, such as the increase in environmental pollution and the emergence of the global energy crisis. Then a turning point occurred, and it began to stop and reconsider the negative impacts, correct the course in all directions, and make peace with the environment. This awakening was reflected in architecture, so the call for friendly buildings such as ecological, organic, green, sustainable architecture, etc. (15)

“Environmental thought has developed throughout history, from ancient primitive architecture to intelligent architecture. Environmental architecture appeared as a result of man’s interest in the environment surrounding him and his influence and interaction with it. His interest in the shelter that protected him from it was the first and most important factor that helped the emergence of environmental architecture. Then architecture developed all the way to the first beginnings of contemporary architecture, which emerged from the civilization of the Industrial Age. Historical eras have been divided into:

**First: Vernacular Architecture:**

Local architecture is the architecture of local communities, in which there is continuity and inheritance of building and design traditions and a connection to the specificity of culture. It is the result of the cooperation of a group of people in the construction process. It is a cumulative, involuntary, and spontaneous architecture without architects. It depends on the concept of trial and error and compatibility with customs and traditions. (14) Image. (1, 2)



Image (1, 2): “Models of local architecture.” (19, 17)

### Research results:

1- Indoor spaces have become one of the sources of pollution as a result of modern methods and materials in construction and the industrial materials it contains that negatively affect human health. There are many factors affecting the pollution of the indoor environment, including the location of the building, temperatures and relative humidity inside the building, and the nature and type of materials used in construction and furnishing. The building, the chemical or physical interaction between the emitted pollutants, the building's insulation and air conditioning systems, the quality and quantity of lighting, and the nature and type of activities carried out inside the building.

2- Technology is classified into technology that is compatible with the environment and another that is inconsistent with it. Technological development affects humans positively and negatively at the same time. The positive impact is represented by increasing human knowledge and capabilities, and the negative impact is represented by the negative effects resulting from the direct application of technology without analyzing it and trying to understand its meanings.

3- Sustainability and the global interest in studying environmental conditions and their impact on human performance is not an academic luxury or a theoretical trend, but rather represents a global applied trend and a conscious professional practice. Sustainable design does not mean planning a natural indoor environment only, as it also depends on calculating the electrical energy consumed and the polluting gases produced. The design remains incomplete until a suitable green interior is developed.

4- The use of alternative materials and recycled materials is of environmental and economic importance, which has encouraged designers around the world to create innovative designs using alternative or recycled materials.

5- The interior architecture designer has a major role in reducing the cost of finishing and furnishing interior spaces, through the optimal selection of the materials used, after studying the characteristics and economics of each material in terms of the best performance, the least cost, and the most suitable for the interior environment.

### Research recommendations:

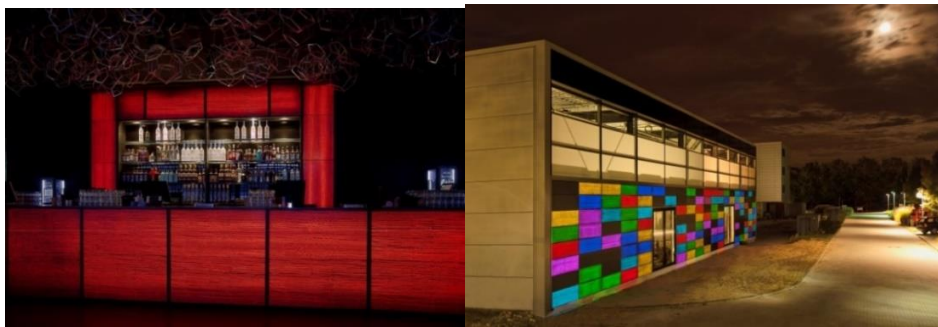
1- The choice of building and finishing materials is very important, not only with regard to nature, but also with regard to the health of the people who live or work in the building and the interior spaces. Natural and organic materials should be chosen, such as wood, cotton, and bamboo, and the use of recycled materials would improve and adds to the internal spaces.

- 2- Although sustainable furniture is a great idea, its durability must be tested, and the shape must be repaired to be more beautiful before it can be produced commercially.
- 3- It is necessary to activate the idea of the green pyramid as a main requirement in interior design work, which contributes to increasing the demand for renewable natural raw materials products such as bamboo, and water-based paints that are not harmful to the environment, as well as developed natural raw materials and other raw materials created from recycled natural materials such as sugar cane straw.
- 4- Fertile scientific studies open the way to obtain new ideas for treating the traditional materials currently available. Therefore, it is necessary to research nature more precisely to benefit from it in providing raw materials that are more environmentally friendly and at the same time responsive to the requirements of the occupants of the interior space in its various activities.
- 5- Activating the concepts and principles of sustainable development through qualified designers to find appropriate environmental solutions capable of providing a safe human environment.
- 6- The necessity of considering waste as a valuable utilitarian resource, as the world cannot live in luxury while wasting and dissipating that waste.

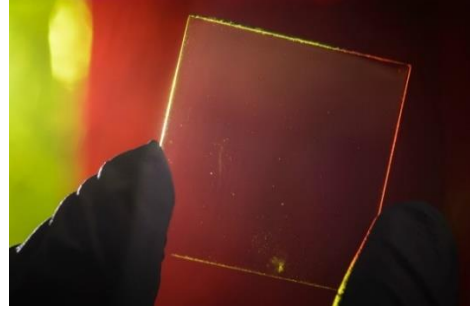
#### **Applied models for developed industrial materials and their use in interior design work and furniture design:**

##### 1- Light-Transmitting Concrete LitrCon:

“A new concrete mixture to which L-Light and a specific type of fiber are added allows daylight to pass through so that the building becomes a large window that uses less interior lighting. Small holes can be made in the concrete that do not affect its effectiveness, but rather increase its transparency to 20 %, it can be used in the walls of public halls, the main and secondary movement paths, and the walls of the inner courtyard, as they are poured during implementation, and it helps save the use of interior lighting and thus save energy. (3) Image (29, 30)



**Image (29, 30): “Using colored, light-transmitting concrete in exterior facades and interior design works.” (12)**



## 2- Transparent solar panels turn facade glass into an energy collector:

(Transparent Luminescent Solar Concentrator):

“A team of researchers at Michigan State University (MSU) has developed completely transparent solar panels that could lead to countless applications in architecture, as well as other fields such as mobile electronics and the automotive industry. The team emphasized the transmittance factor. They developed a transparent solar-powered light concentrator (Transparent Luminescent Solar Concentrator - TLSC) that can be placed on a window or any transparent surface to collect solar energy without affecting the light transmittance. It can be set to capture only the wavelengths of ultraviolet and infrared rays, and the light is transmitted. The collector is at the border of the panel to be converted into electricity with the help of thin strips of photovoltaic solar cells.” (16) This development would provide maximum benefit from building facades, especially for glass towers. Solar energy harvesting would be more efficient and aesthetic, without changing the architectural design. Moreover, this technology could be easily integrated into old buildings. Image (31, 32).