

Sustainable Interior Design for Children Spaces

Ahmed Abdulwahab Rizk, Ingy Ibrahim El-Darwish, Sara Adel Alsheshtawy

Department of Architecture, Faculty of Engineering, Tanta University, Tanta, Egypt
Sara.adel12@hotmail.com

Abstract: The paper's aim is to awareness of the importance of sustainability and use it's principles in interior design. This paper addresses the concepts of interior design, interior space, and sustainable interior design. The latter depends on indoor air quality and materials used. The paper also discusses how to improve internal air to raise its efficiency, after knowing the reasons for pollution of the internal space. In addition to setting criteria for the selection of sustainable materials that can be used in space. This as well as the impact of physiological and psychological sustainability on the child. Eventually, the principles of sustainable interior design for children spaces. [Ahmed Abdulwahab Rizk, Ingy Ibrahim El-Darwish, Sara Adel Alsheshtawy. **Sustainable Interior Design for Children Spaces.** *N Y Sci J* 2017;10(8):202-205]. ISSN 1554-0200 (print); ISSN 2375-723X (online). <http://www.sciencepub.net/newyork>. 23. doi:[10.7537/marsnys100817.23](https://doi.org/10.7537/marsnys100817.23).

Keywords: Sustainability, Interior Design, children

1. Introduction

Interior design of the children's spaces plays an important role in raising the child, developing his abilities and skills to imagine and give him the opportunity to start his imagination in response to what he sees both at home and outside. The interior design must fit into the child's composition in terms of age, intellect and physical composition. The appropriate choice of interior design helps to develop the child's talent and satisfies his creative desire and love of his research.

The importance of planting the principle of sustainability in the concepts of the child since childhood, God created man in the midst of nature to live and coexist with them, the principle has be established in children to develop this thought in their minds creates a new generation aware of the importance of sustainability in all aspects of life.²

2. Interior Design

Is explained as the wide awareness without limit to all the architectural things and details, especially the interior, the materials, what and how to use it. It is the exclusive knowledge of furniture, measurements and distribution in the internal space according to its purposes and color choices. In addition to other coordination matters such as lighting distribution, flowers and other accessories required for the space function⁽¹⁾

The dimensions of the space can categorize the design elements as follows; floors, walls, ceilings, windows, doors and stairs, in addition to furniture, lighting components and complementary elements or vertical limits. Moreover, vertical elements, columns or walls, transitional joints between interior spaces such as openings (doors and windows) and stairs⁽¹⁾.

3. Interior spaces

It is defined as the space designed as the raw material that the designer deals with. The designer defines it as "the surface that is determined by physical, natural, industrial objects and surrounds of by the space.

The space depends on the effectiveness off three elements, lines (one dimension), surfaces (two dimensions) and figures (three dimensions). So, the space is considered the main element of architecture while the other elements are means of assistance.⁽¹⁾

4. Sustainable Interior Design:

Sustainable interior design is defined as "interior design in which all systems and materials are designed with an emphasis on integration into a whole for the purpose of minimizing negative impacts on the environment and occupants and maximizing positive impacts on environmental, economic and social systems over the life cycle of a building"⁽²⁾

Kang and Guerin defined the sustainable interior design practice in three dimensions as: global sustainable interior design, indoor environmental quality, and interior materials. The indoor environmental quality, that is also an assessment category in the LEED, is the most important implication in considering the sustainability of interior environments. Improving indoor air quality which is mainly the activity of reducing indoor pollutants, improves the thermal comfort and quality of interior lighting. Moreover, using materials those can have the possibility of recycling is another criteria in obtaining sustainability. In considering these aspects, most essential interior design elements are materials, furnishing, and lighting.

4.1 Indoor Environmental Quality (IEQ)

Is most simply described as the conditions inside the building. It includes air quality, but also access to daylight and views, pleasant acoustic conditions, and occupant control over lighting and thermal comfort. It may also include the functional aspects of space such as whether the layout provides easy access to tools and people when needed and whether there is sufficient space for occupants. Building managers and operators can increase the satisfaction of building occupants by considering all of the aspects of IEQ rather than narrowly focusing on temperature or air quality alone. People spend the majority of their time indoors; not surprisingly, studies have shown an increase in worker productivity when improvements are made to a space's IEQ. ⁽³⁾

4.2 Pollution of the interior space of buildings:

There are many sources of internal pollution of buildings including:

- "Gas, kerosene, coal and wood fireplaces and heaters are the main source of gaseous pollutants generated from the gas, carbon dioxide, nitrogen dioxide, sulfur dioxide." ⁽⁴⁾
- Asbestos fibers of materials used as insulation and fire-resistant materials in interior decoration works.
 - Compressed and manufactured wood.
 - Some industrial raw materials used in the manufacture of carpets and furnishings.
 - Hazardous household products of detergents, chemicals and various maintenance materials.
 - Unhealthy, cooling and heating systems contaminated with microorganisms.
 - Materials for the preservation and polishing of wood and floors containing pentachlorophenol (PCP).
 - Dyes, inks and adhesives used in interior decoration.
 - "PVC floor tiles made of PVC, and some types of blinds made of the same materials."
 - Adhesives in cladding boards, insulation materials, paint and paint materials, which include formaldehyde and organic solvents.
 - Furniture made from VOCs or chemical compounds that emit contaminated materials.
 - Filters of air conditioning, toilets, dissolved materials and places of waste that cause biological pollutants such as bacteria and fungi.
 - Fumes emitted from car exhaust and smoking, which are external sources polluting the internal environment of the buildings.
 - Domestic animals and their waste.

4.3 Interior Design Element: Materials

In material selection, the most important criteria is to select the material according to the features of

function. Each of every function has specific needs. As an example, materials used in the hospital interior and the shopping mall should be different due to the sterilization aspect. Especially, the selection should aim to long term use. It is very important to use a material in its maximum potential in order to reduce waste of resources.

As, in the process of producing materials, the energy is used. This is called as the embodied energy. Each material has different amount of embodied energy.

For example, concrete, steel and the plastics are higher in embodied energy amount in the construction materials. Especially, natural materials such as stone and timber gradually have less embodied energy.

Another important criterion in material selection is the recycling potential of the materials. There are many studies in the field of waste management which aim to innovate new construction materials.

A Cierra Recycling can be an example to one of these. They collect and separate the waste, and then they transform it and remanufacture these waste products ⁽⁵⁾.

Moreover, the level of emission of toxic gases both used in production process and during the using period of the materials is an essential criterion in achieving sustainability. Especially, most traditional techniques in construction and materials are widely sustainable. As an example, traditional materials like mud brick and adobe are highly sustainable in the means of level of toxic gases emission. They are natural materials. All these criteria are important in maintaining indoor air quality. Finally, materials, as interior design elements, should meet the requirement of sustainability in the potential of long term use, recycling, and less emission of toxic gases.

5. The health and physiological effect of natural materials in the interior design of the children's spaces:

Studies have shown that buildings characterized by good finishing environments can reduce the incidence of allergic diseases, asthma and diseases caused by the effects of buildings containing chemical elements or products of petroleum derivatives and petrochemicals. This directly affects the brain and the immune system.

The improvement of the internal environment leads to an increase in the efficiency of users to space and the benefits of this cost exceed the factor 8 to 14.

The choice of building materials and finishing materials that do not emit influential elements on the air as many of the building materials, maintenance and cleaning. Toxic gases such as volatile organic compounds produced from gypsum boards or compounds forming adhesives for these boards.

Avoidance of microbial contamination using microbial growth resistance, the use of effective drainage and surrounding site design, the need for proper ventilation in bathrooms, good drainage of air conditioning and the control of other building systems in moisture. ⁽⁶⁾

6. The psychological effect of natural raw materials in the interior design of children's spaces

Natural raw material plays an important role in the artistic creation of these internal spaces. The various modern trends have been concerned in one way or another with the return to nature. The designer did not leave an internal space without a deep technical thought and reflection. Nature always inspires the process of design whether it is visual, mental or intellectual ⁽⁷⁾.

7. Sustainable Interior Design for Children Spaces

Flooring:

Some of the best choices for the child and the environment can be found: cork floors, wood floors and bamboo flooring.

1 - Cork floors: are available in many local shops. It is produced in a sustainable manner, without damaging the tree, by peeling the bark of the tree.

2. Wood flooring: is another good option as there are many options and it is widely available, but if the wood flooring was chosen, be sure to have a certificate of FSC (Forest Stewardship Council).

3. Bamboo Flooring: Provides the same wood shape, is a common renewable resource, stronger and more durable than other wood options.

Carpets:

The choice of material should be free from PVC (usually from soybean) and from natural fibers and be made of materials: wool, jute, sisal, hemp, and finally bamboo.

Wall Paints:

Use low or Zero-VOC (Volatile Organic Compounds) paints. The walls can be covered with piles, soft wood or materials that act as soundproofing.

Ceiling:

There are different types of ceilings. Children's rooms are preferred for suspended ceilings from the sounds of absorbent acoustic, gypsum or mineral wool to overcome the sounds of children or their behavior around furniture inside the room.

Window covering:

Here are many eco-friendly options for window coverings. Natural fibers are a good choice, such as bamboo, straw, hemp, sisal, or jute; they help to promote healthy air quality.

A solar panel window can help reduce energy costs, which is not made from plastic (polyvinyl chloride).

Furniture:

Shall be made of sustainable wood. The paints used from low or VOC-free paints and adhesives shall also be non-toxic, and the materials shall be recycled.

Toys:

When selecting games for a sustainable child's space, ensure that there is at least a FSC certificate of soybean or water inks, non-toxic gum, non-toxic substances and recycled materials.

Moreover, purchasing from a manufacturer that has a sustainability policy or an environmental program, where its role towards the environment is maintained. It ensures that they have gone a long way in studies and sustainable production.

8. Conclusions

Interior environments are the places that meet the human needs. They are the most intimate environments to its users. The need of willing to create sustainable environments should be first met in the interiors. People should live in sustainable environments with the help of professionals; interior designers. Interior designer have an essential tool in their hands to lead sustainable environments and create consciousness in sustainability. Interior design elements are the major tools in creating long term used sustainable environments. Finally, interior design elements should be natural resources in the process of fabrication, manufacturing, installation, use, reuse, recycle and disposal. ⁽⁸⁾

9. Recommendations

- Encouraging scientific research in sustainability and sustainable materials in engineering colleges.
- Encourage manufacturers of raw materials and products to reuse agricultural waste to produce environmentally friendly materials.
- The need to develop requirements through the responsible authorities stipulate that no engineer or technician interfere in the selection and identification of materials or design of interior spaces except the engineer responsible for interior design.
- Studying the child's spaces before designing it, taking into consideration using sustainable materials.

References:

1. AB of interior design, Numir Qassem Khalaf, Diyaly University, Iraq, 2005.
2. IFI International Federation of Interior, Architects Designer. IFI Interiors Declaration www.ifi.org retrieved 10 May 2013.
3. <https://sftool.gov/learn/about/1/indoor-environmental-quality-ieq>

4. www.healthyhomeplans.com.
5. Suer, O. and Yilmaz M. An Innovative Waste Management System, 'Cierra Recycling' and Its Product As a Sustainable Building Material Sustainable Building Symposium 2008 Turkey.
6. Can the physical environment have an impact on the learning environment?, Paper, By Peter C. Lippman, JCJ Architecture, New York, 2010.
7. Ali Rafat, Artistic creativity in architecture, Alshorok Publisher, Egypt, 1996.
8. Asford, P. The Implication of Energy Efficiency Measures in Reduction of Carbon Dioxide Emission From European Building Stock, Bristol 1999. 29-6-2017.

8/9/2017