

Suitability of The Interior Design Materials for The Child in Light of Digital Technology

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Abstract:

Childhood is considered one of the most important stages of life a person goes through and is the first imprint of a person in his life, a formative stage in which the basis of the individual's personality is formed and during which he acquires a set of habits, traditions and behaviors that qualify his compatibility with his natural and social environment, and where the experiences with which the child interacts at this stage It leads to crystallizing his abilities and talents and defining the main features he will have in the future.

Researchers and scholars in the fields of childhood have paid attention to children. To develop its capabilities, and not only that of educators; the field of interior design did not overlook it; He was concerned with meeting the needs of the child and developing his creative and innovative side through the good design of the spaces that the child uses.

And the child has an important role in the design process; Where we find that the child is a major user of the vacuum, and accordingly the behavior of the child is monitored when using the vacuum and then knowing the extent of his response to the design and this is done by setting up surveillance cameras and we analyze the child's behavior inside the vacuum, also the child contributes during the design process to test things that have been Its design is to know the suitability of the child, and to ensure its safety, as the child has a role as a provider of design data as the design is for the child, so the child is considered the main source for collecting the data and information required to make the appropriate design.

The materials of the interior design were affected by the modern digital technology in a big way, As smart materials and Nano_Technology materials appeared and the materials developed greatly in terms of flexibility and freedom in formation, which allowed the designer to freely and fluently design without adhering to certain materials and because the materials used in the interior design affect the users of the vacuum, especially the child had to From studying these materials and devising appropriate examples for the child to deal with, there are materials that may negatively affect the child and do not achieve safety elements for him, so the child may be harmed as these materials and inert materials must be characterized by durability, ease of maintenance and flexibility so that the child is not harmed when colliding with them.

Keywords:

Technology - Technique - The Digital Revolution – Smart Material– Nano Technology .

Research problem:

- 1- The absence of studies that focus on studying modern materials suitable for children.
- 2- Neglecting the child's role in the design process.

Research goal: Finding out some suitable materials for the child which are suitable for each age stage the child goes through.

Research methodology: The analytical descriptive approach where the analytical descriptive study of some types of modern materials such as smart materials and nanotechnology materials and their impact on the child's interior design.

Research hypothesis: The study of modern materials used in interior design and influenced by modern digital technology contributes to achieving the optimum job and works on the child's interaction with the surrounding space.

Introduction: The research deals with the impact of digital technology on modern materials and the appropriateness of these materials for the child. Modern technology affected the materials, and smart materials and nanotechnology appeared, as these materials are characterized by flexibility and freedom in formation; Which makes it suitable for use when designing an interior design for a child's facilities:

First: smart materials:

Smart materials can be defined as the bodies that sense what is happening in the environment, process that collect sensory information, and then interact with the environment and the user.

The following table shows a classification of smart materials according to their reactions:

Color Changing Smart Material	Shape Changing Smart Material	Light-Emitting Smart Material
1- Photochromic Materials	1- Thermal Expansion Material	1- Fluorescence Material
2- Thermo Chromic Material	2- Shape Memory Alloys	2- Phosphorescence Material
3-Electro Chromic Materials	3- Electroactive Polymers	3- Electroluminescent Material

Table (1) shows the classification of smart materials according to their reactions.

(Ahmad 2010, p. 130)

(1) Colour-Changing Smart Materials:

These materials are characterized by their ability to change their colour when exposed to an external stimulus and are found in 3 types:

• Photochromic Materials:

They are materials that change their colour when the intensity of light changes. This material is colourless in dark places. When exposed to sunlight or ultraviolet rays, a change occurs in the partial structure of the material and the colour appears. When the source of the illumination affects, the colour disappears. (D. Michelle 2005, p 83)



Figure (1) shows a photochromic wallpaper, where its external appearance changes with the intensity of the lighting. The more intense the light, the clearly visible the drawings and patterns. Axel Ritter 2007, p (79)

• Thermo- Chromic Material:

They are materials that are affected by temperature, so that they change colour when a change in the temperature of the surrounding medium occurs. Thermo - chrome or thermo glass or thermoplastic plastics.

• Electro Chromic Materials:

They are materials that change their colour and also change their external appearance due to their exposure to an electric field so that they are reversible (i.e. refer to their original state).

The glass systems, whose appearance changes when exposed to the electric field in the field of interior design and architectural design, were used in the work of interior partitions, as its colours are able to achieve privacy.



Figure (2) shows the use of chromo electric materials in the interior glass breaks.

(www.electro-chromic-materials.com)

(2) Shape Changing Smart Material:

These materials have the ability to change their dimensions, shapes, or both; In response to external influences represented by one of the following forms (electricity, heat, pressure ...)



Figure (3) shows the Shape Changing Smart Material
([www. shape-changing-smart-material.com](http://www.shape-changing-smart-material.com))

Thermal Expansion Material: •

Thermally extended materials can respond to the thermal changes surrounding them, so this response is the result of a change in their dimensions, shapes, or both.

• Shape Memory Alloys:

Formal memory minerals (SMA) consist of two or more elements of heat treated minerals, and when they combine together, they produce a new material with new properties that have the ability to change the external appearance of the product according to the change in temperature, and this is done by changing the crystalline composition of these materials. (Axel Ritter 2007 p59)

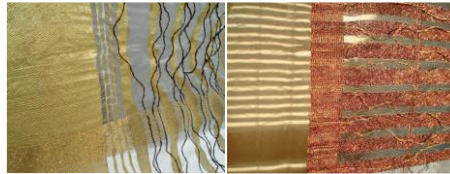


Figure (4) shows some of the internal partitions and drapes made of alloy threads
(SMA) and parallel to the fabric tissue.
(Axel Ritter 2007, p65)

(3) Light Emitting Smart Material:

These materials respond to external stimuli and thus emit light, and the reason for this is that they contain energy-absorbing molecules temporarily; Where it is raised, this leads to the emission of the absorbed energy that generates light in the form of electromagnetic radiation without the occurrence of heat radiation.

These materials are found in three main types:

• **Fluorescence Material.** • **Phosphorescence Material.** • **Electroluminescent Material.**

Second: Nanotechnology:

Nanotechnology has revolutionized all lifestyles and countries are competing to have this technology to take advantage of their amazing potential.

Nanotechnology is the advanced technology based on understanding and studying nanoscience with a rational and creative understanding with the availability of the technological ability to synthesize nanomaterials, control their internal structure and restructure the arrangement of the atoms and component molecules in order to obtain distinct and unique products.

Applications of Nanotechnology in the spaces of the child:

(1) Nano wood:

Through the nanotechnology, Lingo Cellulose is produced as a fibrous tube, which is the elements of wood texture, as it introduces new properties of wood such as cleaning, self-repair, and sterilization.

Special paints for wood were also produced that give wood many advantages such as durability, resistance to bacteria and viruses, resistance to ultraviolet rays, resistance to fire and corrosion.



Figure (5) shows the Nano-treated wood, which is characterized by its resistance to water leakage into its fibers

(<http://product.statano.com/product/9491/nano-wood-stone-olympic-nano-5-liters>)

(2) Nano Glass:

Through the nanotechnology, the fragility characteristic between the glass atoms was treated by reducing the voids to a minimum, and a new type of glass was produced that was strong and unbreakable. The silo dioxide was used between the inner layers of glass to resist fire and heat.

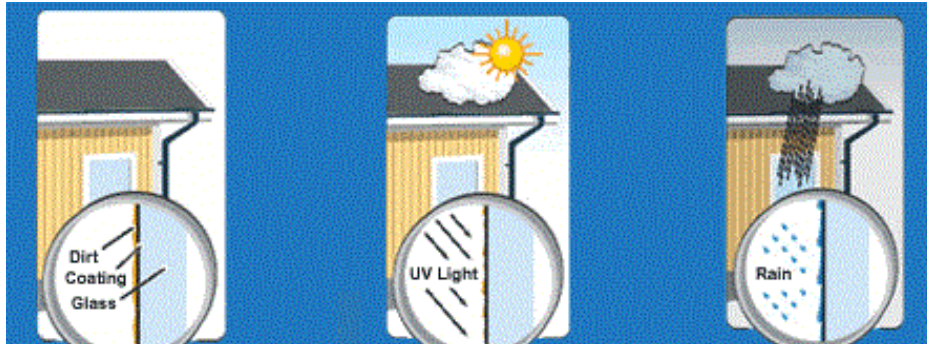


Figure (6) shows the Nano-treated glass, as it is self-cleaning using sunlight

(<http://.technology.com/ct/science-fiction-news.asp?newsnum>)

(3) Smart textiles treated with Nanotechnology:

Scientists have achieved the production of smart fabric, which was manufactured through nanotechnology to give textiles characteristics that they did not have before.

A Smart tissue is a tissue that has the ability to adapt and interact with the surrounding environment and its structural composition. It consists of sensors and actuators, and this is a weaving or integration in the structural structure of the tissue.

Designers combined smart textiles with Nano-treated textiles, producing an interactive fabric that can be integrated into the interactive intelligent interior design system technology.

Some of the modern technological materials used in the design of children's areas and spaces:

1- Jelly Material:



Figure (7) (www.sketchmyworld.com/material-jelly-tiles)
(www.keikooyabu.com)

Advantages: It is characterized by being resistant to scratching and also characterized by flexibility, viscosity, variety of colors and good weather resistance.



Figure (8) shows the jelly gel and its use in making furniture for children.
([Pinterest.com / idea.about.cool.beanbags](https://www.pinterest.com/idea/about.cool.beanbags/))

2- Thermo Sensitive Fabric:



Figure (9) shows the tissues that are sensitive to heat and the colour affected by temperature changes
([Pinterest.fr/smart.textiles.com](https://www.pinterest.fr/smart.textiles.com))

3- Thermo Sensitive Glass Tile:

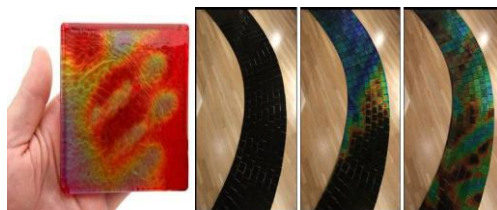


Figure (10) Thermo Sensitive glass Tile
(www.temperature.sensitive.glass.com)

Research Results:

1- Attention to study the materials of the modern interior design and its suitability for the child at every age he passes through.

2-The modern digital technology affected the raw materials of interior design, which allowed freedom in design, so modern materials such as smart materials and nanotechnology appeared.

3- One of the advantages of modern materials is that they provided the opportunity for freedom in design and flexibility in formation.

Research Recommendations:

- 1- The necessity to take care of the child in all the ages that he goes through and study the design and materials suitable for him/her.
- 2- The materials used with the child must be durable, easy to maintain and flexible, in order not to harm the child.

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