Indoor environment quality: A crucial aspect for designing sustainable interiors

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ABSTRACT
The growing trends in population as well as building and construction sector in recent years has an immense impact on environment as well as quality of life, which has led to issues related integrally with increased demand on natural resources. As this sector is growing rapidly, preserving the environment possess host of challenges. The indoor environment of the existing residential as well as commercial establishments can create a sizeable impact on the global environment as well as of the end users. Hence, there is a need to design interiors which minimizes the issues related to environment deterioration as well as impaired quality of life of the occupants. The paradigm shift from ‘environmental irresponsible’ to ‘environmentally responsible’ design, around the world have initiated the use of sustainable interior design practices which contributes towards a healthy environment along with better health and well-being of the occupants. Sustainable interiors leads to Indoor Environment Quality in the built in environment through proper provision of natural daylight, ventilation, acoustics and use of appropriate sustainable interior materials which has low content of Volatile Organic Compounds (VOC’s) resulting in minimum harmful emissions. The major purpose of the study was to identify the practices of selected Interior designers towards designing Sustainable Interiors, focusing on enhancement of Indoor Environment Quality. The study was conducted among sixty practicing Interior designers from Ahmedabad city, who were chosen on the basis of purposive and snowball sampling technique. The findings of the study revealed that majority of the respondents very often followed the Sustainable interior design practices which led to better Indoor Environment Quality. The findings of the present research would be beneficial to educational institutions, government and non-government organizations, practicing architects, and Interior designers to meet the challenges and popularize the concept of Sustainable Interior Design.

Key Words: Sustainability, Interior design, Sustainable Interior design, Indoor environment quality

INTRODUCTION
Environment is God’s gift to humanity. The story of man’s relationship with natural
environment dates back to the dawn of man’s emergence as the dominant species on our planet, Earth. This environment is being irreversibly degraded day by day due to prevalence of human activities aimed towards economic development and improving man’s standard of living. The inevitable outcome of this development and human evolution is the environmental pollution.

The preservation of the delicately balanced ecological system is in interest of whole mankind. Public interest in ecology implies concerns for air and water quality and for increasing demand on limited natural resources in the context of increasing population.

Man has been engaged in efforts to improve his standards of living from the very beginning of civilization. The inevitable outcome of this development and human evolution is the environmental pollution. The relationship between human health and his environment is a two way process. The end users always need amendments in their living conditions to increase their comforts, but at times these alterations leads to damage the indoor environment quality directly or indirectly and which may be harmful to the health of the end users.

It is well known that the earth’s surface and the environmental surrounding, is important to human health. The rapid depletion of necessary resources and a progressive loss of the qualities that we identify with humanity and weakening of physical and mental sanity have forced us to consider the interdependence of man and his environment. The present scenario of environmental degradation, which in line deteriorates the human health calls for development of positive environmental practices, ecofriendly approach and need for sustainability which has to be enhanced.

According to World Commission on Environment and Development (1987); Sustainable development means “Meeting the needs of the present generation without compromising the ability of future generations to meet their own need”.

The terms sustainable and sustainability have both grown increasingly popular in our culture, and are often used in reference to the natural environment which focuses on responsible management of natural resource (McLean, 2009).

Indian Green Building Council (2008), has stated that the building sector in India is growing at a rapid pace and contributing immensely to the growth of national economy. The sector has embraced sustainable design and construction practices in the past decade and enabled India to be on the international map of green buildings along with Sustainable built-in environment.

Sustainability has emerged as a call for a design, a new approach through which it can inspire a new environmental innovation as it has its effect on most aspects of life of an individual (OSHA, 2011).

The Environment Protection Agency (EPA) and National Institute of Occupational Safety and Health (NIOSH) defined good Indoor Environment Quality as the introduction and distribution of adequate ventilation air, control of air bone contaminants, and maintenance of acceptable temperature and relative humidity (Spiegel and Medows, 2006). Indoor air pollution is introduced into the space through materials, finishes, furnishings, equipments and chemicals used inside a building through human activities and biological process (Pilatowicz, 1995). Interior designers help control Indoor Environment Quality by taking precautions with construction or renovation procedures like raising the base of partitions one to two inches.
from the floor to allow the airflow around acoustic partitions in an office space, placing exhaust fans in an enclosed spaces or where pollutants are contained (e.g. a kitchen, smoking lounge, or a bathroom), and considering using plants in interior spaces. Furthermore, designers are also responsible for addressing the client’s need, including the exposure to dangerous chemicals found in the air. While designing Sustainable interior the quality of Indoor environment plays a very crucial role. It refers to adequate air ventilation and daylight penetration which provides connection of interior and exterior environments which leads to enhancement of the indoor air quality along with occupants comfort, well-being and productivity. Use of adhesives, sealants, finishes, paints, coatings, flooring system, agro fiber products, certified wood, which produces low emissions of VOCs and reduce the quantity of indoor air pollutants. Human health, safety, well-being, and productivity can be affected by the choices the designer make. Loftness et al. (2007) stated that improved ventilation helps reduce illness and increase the productivity. International case studies have also showed a 9 to 20% drop in respiratory illness and upto 11% increase in the productivity.

The concept of Sustainable Interior Design is closely linked to environment construction and building design efficiency. Sustainability is becoming a major concern within the Interior design field due to extensive resources needed for interior use (Ruff and Olson, 2009). The interior of residential and commercial areas use some elements which harm the environment in direct or indirect manner. There are paints which contain volatile components (VOC’s) and their emissions are harmful, use of non-biodegradable products for furnishings, use of light fixtures which consumes more electric energy, use of materials which are made from nonrenewable resources and many more elements which degrades the environment and also effects the health of the residents with reduction in the life-cycle of the building.

Cargo (2013) interprets that, Sustainable Interior Design Practices are currently making their way into the professional field of designing, as there has been a growing concern to find place for sustainability within Interior designing profession which focuses on improving the health and well-being of building occupants while reducing the negative impact that the building places on the natural environment.

Sustainable Interior Design Practices should be such which preserves natural environment as well as health and well-being of the occupants. Berman (2008), stated that the practices needed for adopting Sustainable Interior Design are; minimum use of non-renewable energy, produce minimum of pollution and wastes, minimum cost of renewable energy, which would lead in enhancing the health, safety and welfare of the people who lives in the surrounding environment.

Indian Green Building Council (2008), has discovered multifold benefits of Sustainable Interior Design which are; 30 to 40% reduction in energy cost, 20 to 30% reduction in water requirement, enhanced Indoor Environment Quality, use of materials that are non-toxic, better acoustics along with ergonomic consideration, and improved health and wellbeing of occupants. Moreover, the council has also specified that 90% of the time people stay in the indoors, so indoor aesthetics, air quality and comfort are of paramount importance to the occupants. Worldwide, the designers are exploring opportunities to construct interiors considering these key elements which in long run also addresses the national concerns like water efficiency, energy efficiency, reduction in fossil fuel consumption, handling of consumer
waste and conserving natural resources. Most importantly, these concepts enhances the occupant’s health and well-being, which is nowadays assuming greater importance. Therefore, the objective of the study was to assess Indoor Environment Quality as one of the crucial aspect in Sustainable Interior Design Practices carried by the respondents from the Ahmedabad city.

Objectives of the study:
- To study the demographic characteristics of the practicing Interior designers from Ahmedabad city.
- To assess Indoor Environment Quality as the crucial aspect for Sustainable Interior Design Practices.

METHODOLOGY

The research design for the present investigation was descriptive in nature conducted on 60 practicing Interior designers selected purposively from Ahmedabad city of Gujarat state. The tool to collect data was questionnaire which contained a summated rating scale to find out the practices of the Interior designers related to enhancement of Indoor Environment Quality. The responses on the scale of Indoor Environment Quality were subjected to scores. The response structure used to find out the practices of the Interior designers related to enhancement of Indoor Environment Quality was in terms of “Always”, “Sometimes” and “Rarely”. The scores from 3 through 1 were ascribed to the responses. The possible maximum and minimum scores was divided in three categories having equal intervals. The high scores on the scale indicated practicing of sustainable interiors very often which resulted into achievement of better Indoor Environment Quality. The scale was subjected to establishment of content validity and reliability. The tool prepared was validated from panel of 11 experts from different departments, faculty and the Universities. The reliability coefficient derived for the scale was 0.89.

RESULTS AND DISCUSSION

The results pertaining to the study are discussed under the following headings.

Personal variables of the respondents:

Background information of the Interior designers from Ahmedabad city:
This section deals with personal information regarding selected Interior designers of Ahmedabad city. It contains information regarding their age, gender and Educational qualification

Age and gender of the respondents:

The findings revealed that the little less than one-half (48.3%) of the respondents were from the age group of 31 – 41 years. Very few of the respondents i.e. 16.7 per cent were from the age group of 21 – 30 years. The minimum age of the respondent was found to be 23 years while the maximum was 53 years. The mean age of the respondents was found to
be 38.27 years. The findings further also highlighted that little less than three-fourth (71.7%) of the respondents were male and remaining i.e. 28.3 per cent of the respondents were female (Fig. 1).

Educational qualification:
The data pertaining to the educational qualification of respondents, revealed that slightly more than one-third (35%) of respondents were holding Bachelor’s degree in Interior design, whereas very few (15%) of the respondents had done their Master’s degree in Interior design. Moreover, less than one-fourth (20%) of respondents had done their diploma in Interior design and remaining of them had their qualification from field of architecture and civil engineering (B.Arch., B.E. Civil).

Situational variables of the respondents:
It contains information regarding their work experiences, kinds of projects undertaken in which aspects of Sustainable interiors are incorporated and sources of information through which they were informed about the Sustainable Interior Design.

Duration of time working as an interior designer:
The findings revealed that around one-third of the respondents (33%) had been working since 16 years and more in field of Interior design, little less than one-fourth (23.3%) of respondents had been working since 11 – 15 years, slightly more than one-fourth (26.67%) of respondents had been working since 06-10 years while very few of them i.e. 16.67 per cent had work experience of less than 5 years (Fig. 2).

Number and kinds of interior design projects undertaken by the respondents:
The findings analyzed that more than one-half (55%) of the respondents had taken up
commercial projects ranging from 01 – 25 in number. One-fourth of the respondents (25%) had taken up more than 50 commercial projects. Moreover it was also revealed that less than one-fourth (20%) had taken up commercial projects ranging from 26 - 50 in number.

Sources of information on sustainable interior design practices:

Generally, apart from their own experiences Interior designers made use of some sources of information which would make them aware of various aspects of Sustainable Interiors. The data with regards to sources of information of the respondents for adopting Sustainable Interior Design Practices revealed an interesting picture. It was found that magazines (80%), professional associates (70%), educational program (60%), and conference/ seminar (65%)
were the main sources of information for the respondents. One-half (50%) of the respondents got the information regarding Sustainable Interiors through affiliation with professional organizations, little less than one-half (48.3%) of the respondents found out that personal research was helpful in obtaining the information for Sustainable Interiors. It was also found out that little more than one-fourth (28.3%) of respondents were informed about the same through the clients. Very few of the Interior designers got information about Sustainable Interior Design through television (23.3%) and newspaper (15.3%) (Fig. 4).

Findings related to assessment of indoor environment quality practiced as a crucial aspect of sustainable interior design:

The findings reflected that majority of the respondents very often practiced installation of exhaust system in kitchen as well bathrooms and emphasized on provision for proper cross ventilation which leads to adequate air circulation within the interior space. Moreover, it was further analyzed that three-fourth (75%) of the respondents very often tried to incorporate the practice of getting adequate daylight through the windows and skylights which led to better Indoor Environment Quality in all their projects. Furthermore, it was also found that floor mats made up of recycled material was sometimes used by little less than two-third (60%) of the respondents in their projects for gaining thermal as well as acoustic comfort. More than one-half (55%) of the respondents sometimes practiced application of acrylic as primer and natural oil, varnish as topcoats on wooden surface which emits low VOC’s. Moreover, it was also found that little less than one-half (48.3%) of the respondents in sometimes installed proper HVAC (Heat, Ventilation and Air Conditioning) system in their respective projects which leads to enhancement of Indoor Environment Quality (Fig. 5).

Conclusions and implications:

Interior environments are the places that meets the human needs. They are the most...
intimate environment to its users. The need of willing to create sustainable environments should be first met in the interiors by enhancing the Indoor Environment Quality. By playing close attention to the materials, finishes and sealants that are selected for a space an Interior designer can greatly impact the lives of the occupants. Materials and products that often contains high volatile organic compounds (VOC) are paints, coatings, adhesives, carpeting and composition flooring, and these should be carefully selected and used. Sustainable interior design has become a powerful communication tool of the corporate world, which is demonstrating a revolution in the construction industry. It is imperative that the designers begin implementing the sustainable solutions, so as to be prepared for the increasing environmental policy and legislation that is sure to be followed tomorrow, as more natural resources are depleted.

Perhaps, it’s the time to readdress one’s values of the product appearance and material culture in order to tackle the environmental degradation that can result from the steps of design process. The main challenge for all types of designers is to find ways of bringing together the local and the global, to create designs that suit modern, technologically and economically developed societies. This may involve ‘re-designing’ their own designs, a completely new way of working. Interior design decisions can no longer be made based on aesthetics, budget and functionality. Designers now have a responsibility to create indoor environments that reflect environmental awareness, environmental protection and sustainability of building itself. Interior designers must now question the effects of their work not only on the natural environment, but also in view of human health; along with the considerations of the effects of their work on humanity.

Based on the findings of the present study it can be concluded that majority of the Interior designers very often adopted the sustainable practices which enhanced the Indoor Environment Quality. Most of them used the locally available materials which were reused,
recycled and emitted low harmful emissions.

The findings of the study brought out number of implications for action programmes and curriculum formulations in the field of Family and Community Resource Management, Educational institutions, Government and Non-Government Organizations, LEED and SVA GRIHA, Architects and Interior designers.

REFERENCES


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