

# An Analysis on Sustainable Development of Interior Design

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## ABSTRACT

Interior design is based on using natural materials of the building and the corresponding environmental standards. They use material and technical skills and architectural aesthetic principles to create an appropriate function and a comfortable indoor environment to meet the needs of people's material and spiritual life. Therefore, the interior design requirements not only have the use-value to meet the corresponding functional requirements, but also reflect the historical context, architectural style, environmental atmosphere, and other spiritual factors. With the emergence of environmental problems, Sun [1] point out that sustainable development strategy exists not only in developed countries but also in developing economies, such as China. Thus, the design company needs to adjust and modify previous interior design mode and carry forward the concept of green ecological design. In addition, designers should pay more attention to the application value of new materials and new technologies, not only to meet the needs of residents' living environment, but also to improve the ecological construction level of interior environment.

**Keywords:** *sustainability, architecture interior design, Sustainable interior design, green building*

## 1. INTRODUCTION

According to Issa [5], "sustainability" can be a practical tool to balance people's daily life and nature resources. As pointed out in Brundtland's report of the World Commission on Environment and Development in 1983, with the rapid development of the global economy, people should not destroy the natural environment in order to seek business opportunities. Furthermore, Erek et al. (2009, p. 2) cited by Issa regarded sustainability as a survival guide, and human beings should look ahead and believe that limited resources can only be exploited to the extent of renewable recycling, rather than advocating over-exploitation [5]. For interior design [6], its guiding ideology is to make full use of existing natural resources and make rational use of space, land resources and natural energy. Therefore, the main design principle of sustainable development of interior design is to make full use of internal and external environmental factors. On the basis of tapping the technical potential of environmental energy and materials, make full use of environmental energy and materials, or carry out simple technical intervention to make them used by the main body [5]. We can make full use of green energy such as light and wind. However, [2] suggested that we can use

renewable resources directly by understanding and studying ecological resources, such as bamboo, water-saving toilets and other eco-friendly materials that can save energy and environmental protection to the greatest extent.

## 2. THE GREEN BUILDING

As the third layer of skin, architecture has a significant impact on our happiness and happiness [6]. With the economic growth, more and more areas are urbanized, and the problems such as population density, traffic congestion and exhaust emissions are becoming more and more serious. The relationship between built environment and people has always been concerned by designers. Specifically, most architects deal with the ecological, social, and economic aspects of buildings in a community environment. [8]. According to the International Commission on sustainable construction (CIB), the purpose of sustainable construction is "developing and operating a healthy built environment based on resource efficiency and ecological design." Kibert further stated that the principles of sustainable construction apply to the whole construction life cycle, from design to demolition. Furthermore, he [8] also presented that the criteria covers the perspective of the

building approach to supportability, such as vitality and effectiveness, as well as full building approach, by distinguishing the implementation of key areas, such as maintainable location promotion, human and natural wellbeing, water investment funds, material choice, indoor natural quality, social perspectives and prudent quality. The approach was also extended to the resources required to construct and operate the built environment during its life cycle: "land, materials, water, energy and ecosystems." Furthermore, according to Kibert [8], Green Building is defined as "healthy buildings designed and developed in a resource-efficient manner, employing environmentally based principles." In addition, the green construction movement is a relatively new phenomena, especially in the United States, and is growing at an exponential rate. [8].

According to Coulson et al. [15], the goal of higher education is to improve the school experience, become an integral part of the learning process, and maintain a good academic reputation. Building Schools for Future (BSF) in the United Kingdom was discussed by Leiringer, R. and Cardellino, P. (2010) [10]. This program helped improve the quality of UK schools. With the BSF project, architects and educators will be able to take into account the notion of teaching for future development, which encompasses not only educational needs but also technological developments as well as the local and global environment. School projects in Denmark and Sweden were examined by Leininger and Cardellino [10] to show how the quality of school design buildings supports specific educational techniques in order to promote teaching and learning. Consequently, Leininger R. & Cardellino [10] brought out that learning settings can influence students' behavior through this case study. In addition, the design of the ideal school should take into account the surrounding area. Feilden, R. (2004) [12] investigated the idea of building a shopping mall and a recreational area around a university residence hall. His presentation also included a brief history of school building design, from the Victorian period to the present, which noted that historic school buildings are typically meant to be massive, long-lasting structures. But in terms of the growth of technology and the requirements of higher education institutions, he stated that secondary school design projects began taking into account the scale of the structure and the functional components of the design. Feilden [12] outlined the "street layout, campus plan, and linked pavilions" as the three primary techniques for future school building design. Feilden [12] also emphasized the importance of the building's design, emphasizing how much of the main hall and sports hall are lit by natural light. However, school design necessitates creating schools that students and families can be proud of, and Harsstock School in Camden, London, is a great example of this. Until then, the school won't be able to claim its due position as a

vital stop in our children's journey to adulthood and civilized society.

Materials selection should be made to limit energy usage while creating space, according to Zhang, S. (2014) [13]. However, in order to meet market demand, some designers mindlessly pursue client satisfaction and profit without considering future evolution [16]. Furthermore, according to Shedroff, N. (2009) [16], sustainable design may be improved through the use of materials and energy, and designers are focusing on developing new technologies and utilizing recycled materials.

### **3. SUSTAINABLE INTERIOR DESIGN**

Sustainable and environmentally friendly phrases are used by enterprises and individuals around the world [5]. In the process of interior design, designer should ensure that the needs of current consumers and business owners are met as well as those of the next generation, as these concepts play a significant part in corporate and personal strategy today. Meanwhile, environmental issues have become a big problem since individuals want to utilize pricey materials that are difficult or impossible to dispose of; this has led to today's green designers being more popular [6]. It has been argued that sustainable design is basically an aspect of excellent design. When it comes to good design, factors for a healthy environment and energy efficiency will eventually be included [6]. Ashour, Mahdiyar and Haron [3] further stated that the concept of sustainability is founded on the idea that our actions should not degrade our social and environmental infrastructure in an irreversible way. It urges us to take responsibility for improving or changing our current way of life in order to avoid social, environmental, and ecological disasters.

Furthermore, as people seek better indoor places, interior design is becoming more humane and environmentally responsible, as well as increasingly in demand. In addition to having an impact on the natural environment, human health, and economic development, the advantages of sustainable building design can influence people's behavior and increase productivity [17].

On the other hand, many experts have misread the sustainable design concept, and the transformation of historical structures and green spaces is fully based on material selections (Winchip, M. S. 2011) [17]. In accordance with Winchip's findings, Japanese buildings are usually simple and adaptable, requiring designers to use the fewest amount of materials feasible to achieve their goals. Winchip also pointed out that optimal comfort and furniture flexibility are two important features of spatial design that should not be overlooked.

The most important feature of architecture, which is the influence of the inside environment [8]. Many

factors must be taken into account while designing an interior, including the surrounding environment, building materials, and people's actions. Kibert also shown that certain variables, such as "sound, light, odour, temperature, humidity, touch, electrostatic charges, and allergens," interact directly with the sense systems of the residents [8]. According to Bauer, M., Mosle, P. and Schwarz, M. 2010 [6], both daylight and artificial illumination levels influence the level of visual comfort. In general, these two types of illumination can be compared independently since artificial lighting is used in situations when there is no or insufficient daylight. However, in green buildings, these two light sources, as well as their control and regulation, regularly interact. As a result, the transition between daytime and evening illumination is smooth. Physical factors, on the other hand, are normally harmless to building inhabitants, but they might cause health concerns if they are exposed for a lengthy period of time. Kibert, J. C. (2008) [8] argued that "sounds/noise, illumination, temperature condition, and smells" determine the quality of the interior environment. Bauer, M., Mosle, P. and Schwarz, M.(2010) presented that Light color and color reproduction are two factors that influence how a room's lighting ambience is created by its surfaces and illuminants. Besides, high-quality illuminants can create daylight-like ambiances in a room's lighting. Kibert, J. C. (2008) stated that sound appears to be the most difficult for the designer to deal with since it is an intangible form that is unaffected by color, size, or decoration, yet sound levels in specific regions of a structure are within or below an acceptable range for the application. As a result, when constructing a building, distinct spaces with different levels of sound should be addressed. Kibert explained that the quality of the lighting was linked to the sound, and that natural sunshine is the best light source for the eyes. However, because most people prefer to spend their time indoors rather than outdoors, people are moving away from natural light. He discovered that flickering lights can create health concerns by causing irritated eyes and headaches, as well as lowering productivity [8]. When it comes to the hue of light, incandescent bulbs are the best option. Y. Lee (2014) [18] stated that interior design is becoming increasingly important in modern society, not only because of the spiritual demands in social advancement, but also as a form of ethical undertaking for the society and the design itself. Sustainable design concepts have become an integral part of interior design. The relevance of sustainable interior design, according to Lee, S. Y., is mostly related to environmental sustainability, and he believes that renovating buildings not only saves material costs but also helps to promote the local economy. According to the The Leadership in Energy and Environmental Design (LEED) methodology, there are five factors to evaluating green buildings: "site, water, energy, materials, resources, and indoor environmental quality "

[14]. Bauer, M., Mosle, P. and Schwarz, M., (2010) [6] further studied that the LEED Green Building Rating System is a consensus-based voluntary standard that supports and certifies effective green building design, construction, and operations. It provides guidance to architects, engineers, building owners, designers, and real estate experts on how to make the construction industry more sustainable. The rating systems were created for a variety of building applications. In fact, new construction as well as house and non-residential building modernization are evaluated [6]. Kang and Guerin (D. A. Kang and D. M. Guerin) [14] argued that good indoor air quality and human comfort should be part of any sustainable interior design strategy. Also pointed out by Kang and Guerin was life cycle design, which is a way of decreasing waste and protecting resources in the interior materials.

Interior design, on the other hand, is an immersive design activity that allows students to participate in a practical design project in order to find a realistic solution to a real-world problem [19]. In the field of interior design, however, students might utilize an immersive design process that incorporates both theoretical and practical aspects. The student's knowledge has grown as a result of this strategy, which also pushes them to study [19]. Furthermore, Sterling proposed that literature reviews and group discussions where students gather and share different points of view and make observations methods are very important.

#### **4. RETHINKING DESIGN AND INTERIOR**

The concept of sustainable development is extensively utilized in the modern world, and environmentalists specifically apply it to interior design because of the advancement of the globe, the rise in human living standards, and the increase in environmental pollution [9]. With the help of a case study involving a local environmental protection company in the United Kingdom — BEDZED — the author explained that sustainable development design is about effective energy saving through the use of solar power, geothermal energy, wind energy, and rainwater collection for household use. Even more important than choosing environmentally friendly products is a healthy and sustainable lifestyle. BEDZED, according to Anna's research findings, primarily focused on using rain and water in its environmental design, such as tarpaulin on the floor and recycled wood in the spaces, rainwater collection devices on the roof utilized for household water systems in the inside of the building. Furthermore, Anna believes that choosing the right material for indoor furniture is as crucial. As Anna mentioned, sustainable environmental concepts in interior design still need to be implemented in a lot of environmental transformations in existing buildings, therefore designers bear a lot of responsibility.

Although interior designers and architects are distinct professions, Caan, S. (2011) [7] also stressed the distinct roles of designers and their variances. Instead of solely developing amazing architectural shapes, interior design specialists should focus more on the social context and the demands of their clients. The goal of product design isn't to build a great product; it's to ensure that the product can communicate with its intended audience. For human activities, indoor design is critical, as demonstrated by Caan, S. (2011) [7]. Interior design is based on the study of human behavior and psychological activities, and the author believes that in the study of interior design, the use of different design techniques of different products gave us ways to perceive and understand people's behavioral psychology, and that by using this method, we can more accurately analyze people's feelings about space and objects. A study by Buxton, B. (2007) [20] found a link between product design and user psychology, concluding that conventional design methods like drawings should be given more consideration by designers. Creating a user-centered design is a critical step in moving from physical product design to user-centered design, and this experience with sketch design is one of many necessary steps. Buxton, on the other hand, emphasized that designers play an important role in ensuring the quality and uniqueness of new items. The essence of the design is the meaning and capability of the sketch. Thus, words, photographs, and real-world examples exhibit the sketch design skill, which is then extended to the dynamic capabilities of emerging smart devices [20].

A good designer can save time by having solid skills, such as adapting to the old idea, changing ideas, working with end users, and establishing basic design frameworks to limit design scope, which help the designer to make decisions more quickly [20]. Furthermore, Brown and Katz noted that there are three ways in which people's thinking modes might be expanded: business, market, and society. Brown, T. Katz, B also urged designers to produce more disorderly breakthroughs and to focus on a technique of sharing and adapting to reality. Design thinking, as described by Buxton, B. (2007) [11], is a critical aspect in creating a natural design process to analyze progress, modify, define future activities and project bounds, and maintain high levels of creativity. As a result, Caan, S. (2011) [7] asserted that design thinking is beneficial in cultivating and developing the author's creative thinking for the design project.

## 5. CONCLUSION

This article aims to analyze the combination of the concept of sustainable development with interior design, sustainable design as a vital component of the design method, environmental activation of interior

components yields a variety of benefits, including improved building and indoor environment performance, reduced negative impact on the natural environment, and the establishment of true interconnectedness between human-made and natural environments.

According to Lee, Allen and Kim, (2013) [2], the growing popularity of environmentally-friendly interior design motivates designers to adapt their design processes to fit the sustainability paradigm.

The application of systemic issue resolution to interior design ensures the cohabitation of natural and manufactured settings by moving from degenerative architectural design to the transitional phase of sustainable design. That could result in a paradigm that actively promotes the concept of regeneration architectural and interior design.

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