

The Importance of Green Libraries in Terms of Sustainability

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Research Article

ARTICLE INFORMATION

Article history:

Received 1 September 2020

Received in revised form 22 September 2020

Accepted 17 October 2020

Available online 30 November 2020

Journal of Balkan Libraries Union
Vol.7, No.1, pp. 10-16, 2020.

ABSTRACT

Since the mid-1970's, the world's civil society organizations and state institutions have started to be occupied with the concept of sustainable development. A report entitled Our Common Future was prepared by the World Commission on Environment and Development/WCED and the report set out the ideal of a society in which future generations have the ability to meet their own needs in harmony with the natural environment. According to this ideal, in order to achieve environmental sustainability the damage to the environment must be repaired and the harm inflicted in the past should be reduced to the maximum level possible. In this case, it obliges both individuals and institutions to change their behavior. In this respect, the Green Library movement started in the early 1990's as a result of libraries becoming interested in environmental issues in general. With the Green Library movement, literature on Green Libraries began to develop and as a result awareness on the subject began to increase. The Green Libraries bibliography which covers the years 1971-2012, contains 218 publications. Starting in 2016 a Green Library Award is presented to a library annually by the IFLA (International Federation of Library Associations and Institutes). In the article; the Green Libraries focus has been developed on protecting library buildings from disasters and various fires. At the same time, the future of green library current status of state institutions in the world and in Turkey has focused on the need for improvement.

Keywords: Green library, Green library samples, Sustainability.

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I. Introduction

The problems arising from rapid industrialization, unplanned and unscheduled population growth that cannot be prevented in the world give rise to major economic problems on a daily basis. The economic development potential of the countries of the world is declining and causes countries to seek new resources to survive. In 1984, the human activity-induced ozone hole on Antarctica which was first identified began to draw attention to the future damage it could cause to the world. However, while some puny actions have been taken around the world about the negative consequences of globalization on the environment, it is unlikely to be seriously challenged. The capitalist system which is functional in the world prevents

serious objections. In this context, Greenpeace, The European Environment Agency (AEA), The Wildlife Conservation Foundation (WWF), etc. the impact of environmental protection organizations is very high.

Maintaining the continuity of material versus/spiritual resources in the world points to the importance of the concept of sustainability. Sustainability is the ability of nature to make development sustainable by supplying daily needs without jeopardizing the ability to respond to the needs of future generations. At this point today, there is a general consensus that the world's resources and environment are moving towards the limit of extinction as a result of human activities; it is common to belief to that sustainability can only be achieved by allowing the resources offered by nature to be renewed spontaneously. Sustainability is the integration of the corporate/enterprise

interests with a management approach where not only economic growth but also social and environmental issues are included in the enterprise.

Considering these above, information centers should also be developed in terms of sustainability and achieve the status of 'Green Library'.

II. Methodology

The idea that with the expansion of Green Library buildings in the world there will be a noticeable increase in user's library usage rates and satisfaction is also the hypothesis of the study. Documentary screening and depiction methods were used in the research. First of all, global literature sources prepared on the subject were examined and evaluations were made with the information obtained in line with the purpose of the research. Comparative analyses were conducted on samples from Green Libraries to make recommendations.

III. Green Library

Global warming is increasing due to the proliferation of negative factors that cause climate changes in the world and the inability to maintain an environmental balance. Considering that the largest share in the emergence of these negative situations are old library buildings and sloppy landscaping built without the necessary importance of environmental degradation, different perspectives have begun to be developed around the world. With the effect of these factors, the sustainability of Green Libraries and the issue of building and Environmental Protection come to the fore in the concept of building construction over time. With the effect of these elements sustainability, Green Building and Environmental Protection are coming to the fore in the building construction concept. The green sector has the aim of developing green building projects that are compatible with nature able to use energy effectively and take people's health into consideration with certification systems.

The Green Library is the library that promotes sustainability is environmentally sensitive and operates in a way that creates a less carbon footprint (Aulisio, 2013, 3; Kurbanoglu, Boustany, 2014, 7). The carbon footprint is the amount of greenhouse gases released directly or indirectly from human activities. Green Libraries are institutions that are at the forefront of green environmentalism and environmental literacy. Green environmental individuals have basic knowledge of environmental and sustainability issues (Stark, 2011, 5; Kucukcan, Konya, 2013, 170).

Today there are numerous libraries with Green Buildings in various parts of the world. Some of these have been certified platinum and gold. Libraries that have been certified gold include the Zhengzhou Library of the People's Republic of China, the Cesar Chavez Library, and

the Canadian Red Deer Public Library from the United States. Among the libraries that are certified platinum are the Amsterdam Public Library, The Dutch Delf University of Technology Library, The Anna Centenary Library, The National Library of India and Singapore. The Pico Rivera and East Rancho Dominguez libraries are platinum LEED certified while the Malibu, Sorensen and Manhattan Beach libraries are gold LEED certified (Akbulut et.al., 2018, 209).

Green Libraries have positive effects on the user. It is important that users who use the library can feel themselves in library buildings more actively and efficiently. With the positive effects of Green Libraries on human psychology, users can create more creative and active data by feeling like they are in nature. There are many ways to green libraries. In order to minimize the negative impact of Green Libraries buildings on the environment, themes are used in many back buildings. Background themes developed in Green Libraries can be passed on to future generations so that information is also protected. It is also important to adjust the most pleasant light angle so that many users can read more easily. Artificial lighting can be used to reduce dependence in libraries, because sunlight also plays an important role in green design which is good for human psychology. Long-term investments are made when building Green Libraries buildings and at least architects are considering a period of 100 years as they are oriented towards the future.

IV. Green Libraries Structural Features

By examining the characteristics of smart library buildings that combine technology and functionality, elements that can inspire Green Library buildings can be determined. Developing the concept of a Green Library with current developments can make valuable contributions to the general characteristics of library structures. To improve the general characteristics of Green Libraries, it is necessary to identify the elements of basic smart library buildings. By examining various smart library examples around the world, it is important to be able to identify the main differences between traditional libraries and Green Libraries and to transform ordinary library buildings into qualified library buildings. The variety of structures that come with the integration of modern building elements into Green Library buildings gives the impression that human life will be easier. Adaptation to technological developments draws attention to the importance of the formation and development of intelligent library buildings.

About Green Library buildings, the following items can be summarized below. Green Library buildings should be designed and built according to the following characteristics (Mulford, 2010, 4):

- Area Selection: If a new library is to be built, it is

suggested that a place that used to be an industrial area should be preferred. Bringing this region into the environment is an important consideration. After the hazardous wastes and the structure are eliminated building construction is started.

- **Making Improvements to the Existing Building Without Building a New Building:** If the existing building structure is in a favorable position in terms of converting it to green there may be no need to build a new building.
- **Supporting Alternative Transportation:** Green Libraries reduce car use by offering limited parking space. A library-specific bike path and bike parking area are designed to encourage its users and employees to ride bikes.
- **Energy Use: Renewable energy sources** such as solar, wind and geothermal energy are used in Green Library buildings. Various methods are applied to improve the building's energy efficiency. For example, under-door wind holders are fitted in pairs, both inside and outside to protect the heat in the interior environment. Thermal insulation is used. Systems that continuously control ambient temperature are used.
- **Green Roof Construction:** Green roofs with vegetative features are built in Green Library buildings. Green roofs have dust-retaining properties. It absorbs harmful substances in the air and rainwater. Helps clean the air. It provides energy saving by increasing heat insulation.
- **Water Saving:** The quality of the tap ends is improved in order to save water in Green Library buildings. Water cutter feature, low flow tap heads are preferred.
- **Indoor Air Quality:** Low-energy HVAC systems (heating, ventilation and air conditioning) are used to improve indoor air quality. It prevents unnecessary heating, humidification, cooling and drying functions by providing control of heat, humidity and air quality inside and outside the building and provides energy saving.
- **Landscape:** A green organic garden is being built outside the Green Library building. Drought-resistant trees and plants which meet the climatic, geographical features of the region and soil conditions and require less water are planted.
- **Hot Water:** Since the libraries need less hot water, solar water heaters are preferred in Green Library buildings.
- **Lighting:** Energy Star certified lamps and LED bulbs are used. Motion sensors are used to save energy. Large windows are used because it allows natural light to penetrate inside.

After Green Library buildings are examined the contribution of the construction of Green Library buildings to information science is seen in more detail. According to these details, Green Library buildings increase the energy efficiency used by libraries. Libraries that consume less energy are also energy-saving and resources are prevented from being spent unnecessarily. Green Library buildings build a system that is at peace with nature, allowing library users to greenlies themselves as if they were in nature. Human physiology and psychology, flower, insect, soil etc. it is positively affected by factors. People are known to be happier with the support of environmental factors. It can be observed that people can work more efficiently when they feel like they are in nature. In this context, Green Libraries have the ability to organize efficiently by developing the internal psychological structures of people. In Green Libraries, users are more likely to use the highest level of user comfort. At the same time, with the provision of lighting and climate control in libraries with natural resources, there is a decrease in dependence on chemical or hydroelectric elements. Having a large and spacious structure in the city and in the city center will increase both the users of the library and the elements of domestic/foreign tourists who want to see the library. It is also important to choose the library where it is easily accessible to all visitors. Green Libraries are buildings with strong visual impact from a spatial perspective.

V. Examining the Functions of Green Library Buildings in terms of Sustainable Design

The United States Green Building Council (USGBC) is the United States Green Buildings Council. USGBC is the largest environmental and building technology developer organization in the world. The USGBC is a non-governmental organization dedicated to a sustainable and prosperous future with the LEED system, the most preferred certification or rating program for Green Buildings and cities worldwide. LEED is doing technical R&D work that defines the criteria for all buildings and cities of the Green Building rating system. Most of the checklist items below have been adapted from the US Green Building Council recommendations (US Green Building Council, 2020)¹.

Green Library Buildings should be built by looking at the compatibility of Green Library buildings with sustainable design. In accordance with this list, the following elements should be emphasized while drawing the library building modal:

¹<https://www.worldgbc.org/member-directory/us-green-building-council>

TABLE I
GREEN LIBRARY BUILDING MODAL CHECK LIST
(SOURCE: AUTHORS)

Questions	Answers	Notes
1. Does the new building or renovation promote a natural outdoor environment and a healthy indoor living space?	
2. Building project, is designed to prevent a negative impact on natural state?	
3. Is the building designed to provide the maximum benefit from the passive and natural?	
4. Does maintaining innovative strategies and technologies such as porous pavement reduce water and wastewater and its flow?	
5. Does the project reduce the need for individual cars and increase the use of alternative vehicles?	
6. Is the library close to the suburban train, light rail or metro station?	
7. Are there safe bicycle garages within 200 meters of the building?	
8. Are there shower or dressing facilities in the building?	
9. Does the library provide preferred parking for hybrid vehicles?	
10. Is the library building planned for a sustainable area?	

It is important to give 'yes(positive)' answers to relevant questions. If 'no' answers are given to some items, various different library building plans should be considered in order to create a sustainable library space. Depending on the old-new condition of the buildings and the special indoor-outdoor Green Library plans can be made. In these plans, current developments in the world are also followed. But 4 in every way attention should be paid to the 'activities of maintaining innovative strategies and technologies such as porous pavements and ensuring the flow of water and wastewater' laid out in the article. In Green Library concept, these elements should be present.

VI. The Development Process Model of Green Libraries

In green library buildings, the quality and usefulness of the buildings should be increased and their negative impact

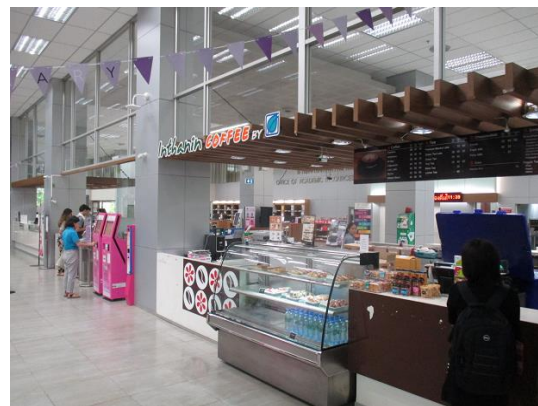
on the environment should be reduced. However, attention should be paid to the following points:

- Various natural foods and beverages are served library areas with social areas are supported.
- Tools that can be used in libraries, homes and gardens lending services can be provided.
- Days to bring children together with the natural environment in libraries editable.

Chulalongkorn University is one of Thailand's oldest universities. Located in Tayland's capital, Bangkok. The university has adopted an approach called the 'Green Chula'. Chulalongkorn University Library also adopts innovative approaches according to users expectations. Because today's user expectations also vary and they prefer places with higher technology that meet their needs.

TABLE II
USERS BEHAVIOURS AND EXPECTATIONS CHANGE²

Behaviours	Expectations
<i>Always online</i>	Library as place / 2nd home for working and playing
<i>Cell phones are part of their body</i>	Services on mobile applications
<i>Use services via applications</i>	E-resources (24/7 access)
<i>Prefer e-books</i>	Modern / hi-tech services
<i>Need collaboration spaces</i>	Coworking space for group work or chat
<i>Grow up with massively multiplayer online games</i>	Learn 21st Century skills
<i>Grow up with boardgames</i>	



² <http://gb.oversea.cnki.net/Seminar/2019Seminar/bg/images/hypdf/dh/11.pdf>

Fig. 1. Chulalongkorn University Central Library food and beverage cafe (left), green designed study halls (right) (Source: A. Kuzucuoğlu Archive)

Chulalongkorn University Central Library also serves as a Green Library. The library serves on 7 floors with the slogan 'bridging people to knowledge'. User comfort is enhanced through climate control, carbon dioxide and moisture monitoring systems. The Office of Academic Resources will make improvements to the library to bring it up to the ISO9001:2015 rating and will create a 'Green Library' by replacing fluorescent lights with energy-saving LED bulbs³. In the library, measures such as fire detection early warning systems, emergency lighting, evacuation routes signs, fire extinguishers and fire cabinets were also taken.



Fig. 2. LED lamps at Chulalongkorn University Central Library (left), Fire cabinets with transparent doors (right) (Source: A. Kuzucuoğlu Archive)

In October 2019, the Office of Academic Resources made the Chamchuri 10 Building library completely unmanned - there are no staff at all working there. Users simply scan a card to enter the building, select the books they would like to read and they are delivered via the innovative Mobile Telepresence Robotics (MTR) system. When the library is about to close an alarm will remind everyone and then the door will be automatically closed.⁴

5th International Federation of Library Associations and Institutions (IFLA) Green Library 2020 award was won by

Rangsit University Library, Thailand. Sustainability permeates nearly all of their infrastructure, operations and educational goals in an exceptional way. The library monitors its energy, paper and water usage as well as other activities, thus making it possible to evaluate how well the goals are being met.⁵

The development of green standards is linked to the needs of sustainable and viable library projects. This means increasing the quality and usefulness of the building and reducing its environmental impact. The realization of all these will require the technical systems (heating, ventilation, air conditioning, water supply, lighting and material selection) to be at an optimum level. Ensuring less energy consumption by using systems such as solar energy, led lighting systems, zero waste projects, using water more economically, using water purifier systems, not using systems that require a lot of energy at the same time (if not necessary, deactivating walking stairs and elevators), a greener design in indoor and outdoor environments, natural ventilation methods can be given as an example.



Fig. 3. Water purifier, waste sorting (left), e-waste collection box (right) (Source: A. Kuzucuoğlu Archive)

VII. Conclusions and Recommendations

Environmental design should be preferred during the construction phase of libraries. The materials used while constructing the buildings, the wastes and gases that may occur after the construction is consumed rapidly the world's natural resources. For this, it has become more important to create green buildings with the concept of sustainability all over the world. There are institutions such as 'LEED' that determine the rules and standards to be

³ <http://www.sustainability.chula.ac.th/report/187/>

⁴ <http://www.sustainability.chula.ac.th/report/187/>

⁵ <https://www.ifla.org/node/92963>

followed in order for a building to become a 'green building'. These institutions create guidelines for Green Building Certificate Systems.

Libraries need to move rapidly towards the goal of becoming a Green Library with their increasing user capacity. The expectations of new generation users are also changing. They demand places where they can feel safer with systems that are more environmentally friendly, that require zero waste, that enable waste to be recycled and use less energy.

When the indoor air quality specified in the standards is ensured, when the materials used in the interior are selected not to harm human health, when the interior comfort conditions are purified from the risk factors such as temperature, relative humidity, air pollution, dust, radiation, noise etc. When the high-temperature buildings are removed (reducing asphalt spaces, increasing green areas), health and disease risks will be minimized, working quality and work efficiency will be increased.

The most successful projects and applications of Green Libraries should be encouraged and expanded. The most efficient use of limited resources should be ensured. Environmental standards should be adopted in Green Library practices to be carried out, environmental harmony and a greener design should be taken into consideration in indoor and outdoor spaces. Users should have access to information in smart buildings equipped with hi-tech.

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