

THE INTERIOR DESIGN OF PUBLIC LIBRARIES BASED ON DIGITAL TECHNOLOGY AND BIOPHILIA

Steffanie Hidajat¹ Hartini Laswandi^{1*} Silvia Meliana^{1,2}

¹Interior Design Program, Faculty of Art and Design, Universitas Tarumanagara, Jakarta, Indonesia

²Interior Design Department, School of Design, Bina Nusantara University, Jakarta, Indonesia

*Corresponding author: Email: hartini@fsrd.untar.ac.id

Submitted : July 2022, Revised : December 2022, Accepted: May 2023

ABSTRACT

Globalization has resulted in drastic changes in the modern world, especially in the communication and information technology field, which has led to an increasingly competitive and knowledge-based world resulting in the increase of dependence on economy, education, knowledge, learning, and culture. In the modern era, libraries, which not only act as centers of information and educational resources but also as community centers and gathering areas, are the foundation of the public education system that has shifted to the use of digital technology. The design of a public library that integrates digital technology and biophilia is aimed at creating opportunities to discover, solve problems, and inspire innovation while also restoring attention, creativity, and individual well-being. This study applies a qualitative descriptive method with data collection techniques in the form of literature study and observation. Some of the digital technologies found in the design of the DKI Jakarta Provincial Public Library include RFID-based self-checkout services, LED screen displays, floorstanding touchscreen monitors, virtual reality, 3D printers, and computers. Meanwhile, the element of biophilia is applied directly and indirectly, by utilizing sunlight, implementing living green walls, biomorphic elements, and natural materials.

Keywords: Biophilia, interior design, public library, technology

1. PREFACE

Globalization has changed and shaped the modern world. Although it is quite complicated to define, globalization can be broadly described as the connectedness and interconnectedness of every aspect of society [1]. Tonca argues that the concept of globalization is multifaceted, crosses different disciplines, and is concerned with the integration of economic, technological, educational, and cultural aspects of human endeavor [2]. Meanwhile, Misra stated that globalization is a cross-border integration of people, business, and capital achieved through the flow of information, technology, and ideas exchange [3].

Drastic changes in the modern world occur in the information communication technology (ICT) field. The breakthroughs brought by technology to the fields of knowledge, education, business, communication, and learning have resulted in creating a knowledge-driven society that determines the progress of a society and is the backbone of socio-economic development and decision-making. Thus, people are encouraged to access, assess, adopt, and apply knowledge, to think independently, make appropriate judgments, and to collaborate in understanding a subject [4].

In the modern era, with the dominance of education and expertise, the library which is a repository of information resources, where the storage and distribution of information are managed efficiently, becomes the foundation of the public education system. The presence of technological developments and the expansion of information, which in addition to accelerating the phenomenon of globalization, has also completely revolutionized the role and services of modern libraries [5]. In an environment where people possess modern knowledge, there are several types of libraries, such as libraries as learning and research centers [6], where in

supporting this function, several technology-based facilities have been introduced and implemented. Some of these include library management systems, e-books, mobile technology, artificial intelligence, virtual reality, and the internet [7]. The growing impact of technology has resulted in libraries to transform into centers of information resources which utilize digital technology to provide more efficient services. Technology-based services in libraries have enabled effective learning such as facilitating remote access to information resources in libraries, increasing access to information and data from various sources, connecting experts from various research fields, creating a means to access information resources throughout the day, increasing speed and conditions of access to scientific information, and providing access to the latest information regarding any research or career field [8].

In addition to carrying out its function as a center for information and educational resources, the public library is also identical as a community center and an area for gathering. To support this function, the library must be able to provide opportunities for visitors to socialize, relax, and recover. One alternative that can meet these needs is utilizing nature.

The positive effects of nature on humans have been confirmed through several theories, such as attention restoration theory, stress recovery theory, and the biophilia hypothesis. Attention restoration theory argues that humans have a tendency to pay attention to natural content and respond positively. With this, nature can become a 'restorative environment' capable of restoring attention [9]. Stress recovery theory explains that natural factors, such as vegetation, water systems, natural textures, and landscapes, are sufficient to provide a conscious recovery experience by evoking positive emotions about the environment [10]. The biophilia hypothesis states that there is an instinctive relationship between humans and other ecosystems. This theory implies the inherent attachment of humans to nature [10]. Biophilic design combines the benefits of nature with space in an active and systematic way. This design concept aims to utilize various natural elements and their changes in architectural design as well as integrate and utilize various natural elements to satisfy human instincts to be exposed to nature. According to Browning et al, biophilic design is based on the biophilic aspect by fostering a positive relationship between humans and nature to improve the physical and mental well-being of human life [11]. In modern environments, biophilic designs can provide communities with healthy habitats that enhance human health, fitness, and well-being [12]. This design can reduce stress levels and improve the welfare of life by integrating humans and natural elements [13].

The DKI Jakarta Provincial Public Library plays an important role in providing a safe, accessible, and free educational resource center for every member of the community in Jakarta. However, the number of visitors in this library has decreased since 2016 with the increasing generation of digital natives who enjoys an all-online environment, enticed by information in the form of interactive image, and prefers to dynamically process visual information [14]. Therefore, the author is encouraged to design the DKI Jakarta Provincial Public Library which applies elements of technology and biophilia so that it is in accordance with the era and technology while also paying attention to the restoration of attention, creativity, and individual welfare.

2. RESEARCH METHOD

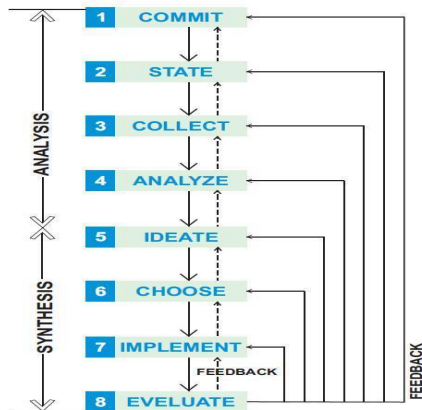
The method applied is a qualitative descriptive method. This method is intended to let readers comprehend the object of research in the form of description by utilizing words as well as natural methods [15]. Meanwhile, the design method applies the design process according to Rosemary Kilmer and Otie Kilmer. This design process consists of two stages, namely the analysis (programming) and synthesis (designing) stages, in which both are broken down into several steps such as [16]:

- A. Commit, is the initial stage where the author commits to the DKI Jakarta Provincial Public Library project.

- B. State, is the stage where the author formulates problems regarding the effects of globalization and technology on the decline in the number of library visitors and later proposes a solution that can restore the attractiveness of library through a design which implements digital technologies.
- C. Collect, is the stage where the author collects data in the form of non-physical data and literature through articles, previous research journals, final project reports, and books.
- D. Analyze, is the stage where the author analyzes the problems in the project
- E. Ideate, is the stage where the author expresses design ideas in the form of schematics and concepts as well as making alternative designs through design sketches.
- F. Choose, is the stage where the author chooses the most suitable alternative design from the existing ideas.
- G. Implement, is the stage where the author channels ideas through 2D or 3D drawings and supporting presentations.

Figure 1

Design Process Diagram



Source: Rosemary Kilmer and Otie Kilmer, 2014

Research data collection techniques include literature study where the author observes various theoretical data such as literature data obtained through articles, previous research journals, final project reports, and books as well as through non-participant observation.

3. FINDINGS AND DISCUSSIONS

Analysis Results

The DKI Jakarta Provincial Public Library is one of the libraries regulated under the Department of Library and Archives (Dispusip). This library is open to the public with PPID (Information and Documentation Management Officer) as the spearhead of information services at Dispusip tasked with managing and providing information services to the public.

This library offers various facilities such as reception area, book area, general reading area, children's area, mini auditorium, e-learning room, multifunction hall, and several other sections. Fundamentally, it accommodates the function of libraries as centres of information resources, however, this library appears to be old-fashioned with a plain look of its interior and its minimal use of digital technology. Meanwhile, in 2020, Digital 2020, a report by Simon Kemp, stated that more than 50% of the total population in Indonesia were internet users, an increase of 17% from the previous year. This shows the rapid development of the digital generation in society

Design Concept

The DKI Jakarta Provincial Public Library takes up the theme of “A Touch of Nature and Technology”. This theme is intended to illustrate a library that adopts elements of technology complemented by a fine touch of nature. The adoption of this theme is also adapted to the times, where technology has advanced, information dissemination has become easier, and libraries have taken on the role of community centers and gathering areas.

The application of this theme on the interior of the DKI Jakarta Provincial Public Library is expected to create opportunities to find, solve problems, and inspire innovation along with restoring attention, creativity, and individual well-being.

Implementation of Elements of Technology and Biophilia in Design

Front Office

As an essential part of libraries, the front office area, which functions as a reception area for visitors, is amongst the areas selected to be designed in this project. In this area, technological facilities provided include RFID-based (radio-frequency identification) self-checkout service machines and LED screen displays based on modular panels.

Figure 2

Front Office Area at the DKI Jakarta Provincial Public Library



Source: *Steffanie Hidajat, 2021*

Figure 3

Front Office Area at the DKI Jakarta Provincial Public Library



Source: *Steffanie Hidajat, 2021*

An RFID-based self-checkout service machine is operated to assist visitors in borrowing and returning books. Visitors are able to carry out both activities independently by the simple step of scanning the barcodes found on the back of each book which will automatically be detected by the machine afterwards. The LED screen display located behind the self-check-out service machine is supplied to operate as a signage completed with an attractive visual.

Figure 4

Hybrid SelfCheck 1000



Source: *Linkgibbor Limited, 2021*

The biophilia element in this area can be spotted in the usage of a round planter seat decorated with peace lily plants. Additionally, natural elements can also be perceived by room users through the entry of sunlight from the existing skylight which is located right above the round planter seat.

General Reading Area

As one of the key areas in a library, the general reading area is facilitated with floor-standing touchscreen monitors to help assist visitors in finding information, whether it be on books or mapping out the locations of the various areas in the library.

Figure 5

Floorstanding Touchscreen Monitor



Source: *Mandiri Artha Solusi, 2021*

A side of this area is occupied by several large windows which provide a magnificent view of the outdoor garden in the building which in turn allows lots of sunlight to enter and further expose visitors to nature.

Other facilities in this area include tables, chairs, and bookshelves which can also be utilized as seats with its staircase-like design. Each of these facilities indirectly exposes the element of biophilia by using veneer finishing materials. A decorative ceiling element decorated with artificial plants encircled by a net with hexagonal holes which depict a beehive as a form of biomimicry are hung right above the table.

Figure 6

General Reading Area at the DKI Jakarta Provincial Public Library



Source: *Steffanie Hidajat, 2021*

Figure 7

General Reading Area at the DKI Jakarta Provincial Public Library



Source: *Steffanie Hidajat, 2021*

Figure 8

General Reading Area at the DKI Jakarta Provincial Public Library



Source: *Steffanie Hidajat, 2021*

Quiet Room

Quiet room is an area that is intended to give visitors the opportunity to focus in a quiet environment. In this area, the technology applied is a touchscreen monitor in the back of the room and the biophilic element can be spotted in the use of green wall partitions and veneer materials on the bookshelves.

Figure 9

Naava Green Wall Partition



Source: *Naava, 2021*

Figure 10

Quiet Room at the DKI Jakarta Provincial Public Library



Source: *Steffanie Hidajat, 2021*

Figure 11

Quiet Room at the DKI Jakarta Provincial Public Library



Source: *Steffanie Hidajat, 2021*

Children's Area

Located on the second floor, the children's area is equipped with a huge LED screen display and bean bags in order to let children watch and relax.

Figure 12

Children's Area at the DKI Jakarta Provincial Public Library



Source: *Steffanie Hidajat, 2021*



Figure 13

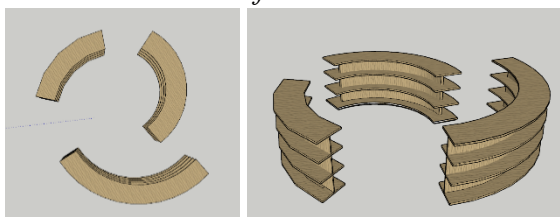
Children's Area at the DKI Jakarta Provincial Public Library

Source: *Steffanie Hidajat, 2021*

The element of biophilia in this area is implemented through the use of biomimicry which essentially is an imitation or use of forms commonly found in nature. Biomimicry in this area is seen in the design of the bookshelf which is inspired by sea shells, thus, it has a spiral shape. Another natural element applied is the use of plywood with veneer finishing.

Figure 14

Children's Bookshelf



Source: *Steffanie Hidajat, 2021*

E-Learning Room

The presence of an e-learning room is aimed to provide an opportunity for visitors to get a digital library experience. The e-learning room is equipped with several technology-based facilities such as virtual reality (VR), 3D printers, computers, and printer/photocopy machines.



Figure 15
Virtual Reality Equipment
Source: Google Images, 2021



Figure 16
LFS 3D Printer
Source: Google Images, 2021

This e-learning room is also equipped with a table in veneer finish and a living green wall behind the bench in between the two VR zones.



Figure 17
E-learning Room at the DKI Jakarta Provincial Public Library
Source: Steffanie Hidajat, 2021



Figure 18
E-learning Room at the DKI Jakarta Provincial Public Library
Source: Steffanie Hidajat, 2021

4. CONCLUSIONS

In the digital era, with the dominance of education and expertise, libraries have turned into centers of information resources that utilize digital technology to extend efficient services as well as community centers and gathering areas that can provide opportunities for visitors to socialize, relax, and recover.

Some of the digital technologies implemented in the interior design of the DKI Jakarta Provincial Public Library are RFID-based self-checkout service machines, LED screen displays, floorstanding touchscreen monitors, virtual reality, 3D printers, and computers. Meanwhile, in fulfilling its function as a community center, the element of biophilia is implemented in the design due to the positive effects of nature on humans, such as for restoration of attention, recovery of stress, and restoration of creativity. Biophilia elements in this library are applied directly and indirectly. The direct element of biophilia in the library consists of the use of living green walls and the utilization of sunlight through windows and the skylight in the building. The element of biophilia is also indirectly implemented in the library by using biomimicry elements, natural materials, and natural colors.

The application of elements of technology and biophilia can adjust the role of libraries in digital era, where information dissemination has become easier and the library has established itself a community center.

REFERENCES

- Bakhtiari, S. (2014) "Globalization and Challenges: Challenges and Opportunities," *International Business and Economics Research Journal (IBER)*, vol. 5, no. 2, pp. 95-99, 2011.
- Browning, W, Clancy, J and Ryan, C. (2014) . Fourteen Patterns of Biophilic Design, New York: Terrapin Bright Green, LLC.
- F. B. M. I, (2018) "Globalization: Evolution and Consequences in Libraries," *International Journal of Research and Analytical Reviews*, vol. 5, no. 4, pp. 649-653.
- Ghaith, G (2010) "An Exploratory Study of The Achievement of The Twenty-First Century Skills in Higher Education," *Education + Training*, vol. 52, no. 6/7.
- Jones, A.(2010) *Globalization: Key Thinkers*, Cambridge: Polity Press.
- Kaplan, R and Kaplan, S. (1989) *The Experience of Nature: A Psychological Perspective*, New York: CUP Archive.
- Kellert, S and Calabrese, E (2015) .*The Practice of Biophilic Design*.
- Khan, J (2016) "Impact of Information Communication Technology on Library and Its Services," *International Journal of Research-Granthaalayah*, vol. 4, no. 9, pp. 97-100.
- Kilmer, R and Kilmer, O. (2014) *Designing Interiors*, New Jersey: John Wiley & Sons.
- Misra, S. (2012) "Implications of Globalisation on Education," *Romanian Journal for Multidimensional Education*, vol. 4, no. 2, pp. 69-82.
- Moleong, L. (2005) *Metodologi Penelitian Kualitatif*, Bandung: PT Remaja Rosdakarya.
- Molthrop,(2011) "Biophilic Deesign: A Review of Principle and Practice," *Dartmouth Undergraduate Journal of Science*, pp. 37-39.
- Pareek, N and Gangrade,A (2016) "Role of the Libraries as Information Resources in Globalization," *International Journal of Librarianship and Administration*, vol. 7, no. 1, pp. 13-23.
- Rafik, S M A and Oke, O C. (2019) "A Study on Emerging Technology trends in Academic Libraries: An Overview," in *Reshaping Librarianship: Innovations and Transformations*.

- Tonca, R.A, (2017) "Libraries in The Globalisation Era," *Acta Technica Napocensis: Civil Engineering & Architecture*, vol. 59, no. 3, pp. 53-62.
- Ulrich, R.S, Simons, R F, Losito, B D, Fiorito,E, Miles, M A and Zelson, M (1991) "Stress Recovery During Exposure to Natural and Urban Environments," *Journal of Environmental Psychology*, vol. 11, no. 3, pp. 201-130,.