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Integration of Biophilic Design at the Bandung City Archives and Library Service

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ABSTRACT

This research aims to analyze the implementation of a biophilic approach in the new design of the Archives and Library Department of Bandung City as a response to the challenges of urbanization and the need for public spaces that support the psychological and ecological well-being of the community. Through a qualitative descriptive approach, this study observes and analyzes the design concepts applied to the lobby area, children's reading room, and young adult and adult reading rooms, based on biophilic principles. The results show that the design integrates natural elements through the selection of neutral and bright colors inspired by nature, the use of natural materials such as wood, rattan, and natural stone, and the addition of vegetation. Furthermore, maximizing natural lighting is a key focus in creating comfortable and supportive spaces. This biophilic implementation is expected to enhance user experience, reduce stress, improve focus, and strengthen the library's function as a recreational, educational, and regenerative community space. This research provides practical contributions to the application of biophilic design in public facilities in Indonesia.

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1. INTRODUCTION

In an era of increasingly rapid urbanization, large cities like Bandung face serious challenges in maintaining a healthy and sustainable environmental quality. As a center of education and culture in West Java, Bandung is not only required to provide functional public facilities but also to create spaces that support the psychological and ecological well-being of its residents. One public facility with great potential as a community space and learning center is the public library. As a fundamental public facility, public libraries have significant potential not only as information repositories but also as learning centers and community spaces. Libraries provide access to various sources of knowledge that are crucial in efforts to educate the public, in accordance with the mandate of Law Number 43 of 2007 concerning Libraries (Muhaimin et al., 2022). Along with the times and changing user needs, particularly in the digital era, libraries face the challenge of adapting, particularly in providing relevant facilities for Generation Z, who prioritize ease and speed of access to information (Nimita & Rosetia, 2023). Furthermore, libraries contribute to improving public literacy by providing rich learning resources and a discussion environment, despite often facing challenges such as limited collections and accessibility (Annurwanda et al., 2022; Suprianik et al., 2024). However, most libraries in Indonesia, including those in Bandung, are still designed with a conventional approach that pays little attention to sustainability and natural comfort for users.

In recent decades, the biophilic approach in architecture and interior design has gained increasing attention in response to the need for spaces that connect humans with nature. This approach is based on the biophilic theory proposed by Edward O. Wilson, which explains that humans have an innate tendency to connect with nature and natural elements. This concept, as Wilson states, refers to "a natural tendency to focus on life and life-like processes" (Thomson & Newman, 2021). Empirical evidence suggests that interaction with nature provides psychological benefits, such as improved cognitive function and mental health (Bahador & Mahmoudi, 2023; Fukano & Soga, 2024). The application of biophilic design principles has been shown to not only enhance visual comfort and aesthetics but also improve mental health, enhance concentration, and strengthen social engagement in public spaces.

The implementation of biophilic design in public facilities, such as libraries, can have a significant positive impact on the mental health, well-being, and productivity of its occupants. Biophilic design integrates natural elements into the built environment, which has been shown to benefit both individuals and the wider community (Abraham et al., 2023; Zhong et al., 2022). Specifically, in the library context, biophilic design can reduce stress levels and enhance the learning experience for visitors (Sakip et al., 2024). One important aspect of biophilic design is creating a connection between users and nature. This can be achieved through various elements within the space, such as natural lighting, natural ventilation, and views of the outdoors, which are known to improve mood and reduce anxiety (Munir et al., 2024). Research shows that when these elements are implemented in learning spaces, there can be a decrease in blood pressure and heart rate, as well as a significant improvement in the learning experience (Sakip et al., 2024). Furthermore, the integration of biophilic design can also improve psychological well-being by generating feelings of comfort and relaxation among library visitors. This supports research showing that interaction with natural elements enhances creativity and focus, which are particularly important in the context of learning and research that often occurs in libraries (Xing et al., 2025). Engaging with natural environments is not only beneficial for individuals but also improves the overall quality of the social environment, creating a space conducive to collaboration and discussion (Turki et al., 2023).

Unfortunately, studies on the application of a biophilic approach to public libraries in Indonesia are still very limited. The Bandung City Archives and Library Service, as one of the

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city's cultural and literacy icons, requires a redesign that is not only modern and adaptive, but also considers aspects of environmental sustainability and the psychological health of its users. Therefore, this study aims to design a new concept for the Bandung City Archives and Library Service with a biophilic approach, which integrates natural principles into the overall architectural and spatial design.

By presenting a library design that prioritizes the interaction between humans and nature, it is hoped that this facility will not only function as a literacy center but also become a recreational, educational, and regenerative space for the urban community of Bandung. This research is expected to make a tangible contribution to the development of holistic public facilities and serve as a reference in the design of biophilic-oriented public buildings in Indonesia.

The purpose of writing this article is to examine the biophilic aspects of color, materials, and natural lighting in the lobby area, children's reading room, and reading room for teenagers and adults.

2. RESEARCH METHOD

This research approach uses a qualitative descriptive approach to understand and analyze the new design of the Bandung City Archives and Library Service at Jl. Seram No. 2, Citarum, Bandung Wetan District, Bandung City, West Java with a biophilic approach. This approach was chosen to explore in depth how the biophilic concept can be applied in the design of the reading room.

Figure 1. Bandung City Archives and Library Service
(Source: dispusip.bandung.go.id, 2025)

Data collection methods in this study was carried out using several techniques, namely: literature studies, field observations, and documentation.

3. RESULTS AND DISCUSSION

3.1 Lobby Area

Biophilic design emphasizes the importance of color, materials, and natural lighting to create spaces that support comfort and well-being. In this lobby, the dominance of dark and neutral colors like black and brown creates a formal atmosphere and lacks the natural,

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calming hues of leaf green or sky blue. In terms of materials, metal, plastic, and glass dominate, while natural elements like wood or stone are barely present, creating a space that feels stiff and lacking emotional warmth. Natural light available through windows is not optimally utilized, allowing artificial lighting to dominate and reducing the visual connection with the outdoors. Overall, these elements demonstrate that the lobby has not fully embraced biophilic principles that support a harmonious relationship between humans and nature.

Figure 2. Lobby of the Bandung City Archives and Library Service
(Source: dispusip.bandung.go.id, 2025)

Figure 3. Colors in the Library Lobby from the Front
(Source: Authors, 2024)

Figure 4. Colors in the Library Lobby from the Right Side
(Source: Authors, 2024)

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The lobby of the Bandung City Archives and Library Service features a color palette dominated by neutrals, creating a warm, comfortable, and modern atmosphere. The main element is cream, sourced from wood and rattan. This cream color is consistently applied to interior elements such as vertical slatted partition walls, a parametric ceiling that forms dynamic curves, computer desks, and chairs designed to blend in with the natural setting.

Additionally, light gray enhances the neutral tone of this space. This color comes from HPL, natural stone, and exposed concrete, used on elements like the floor, concrete chairs, and reception desk, creating a sturdy and modern feel. White is applied to the ceiling, helping to reflect light and create a brighter and more spacious feel.

As a refreshing element, the green of living plants placed in several corners of the room creates a natural accent, reinforcing the eco-friendly feel and adding a touch of life to the lobby. This color combination not only reinforces the space's visual identity but also creates an inviting atmosphere for library visitors.

Figure 5. Materials in the Library Lobby Area
(Source: Authors, 2024)

The lobby of the Bandung City Archives and Library Service is designed with a material approach that conveys a modern, warm, and natural feel. The lobby floor uses gray granite, providing an elegant appearance and high durability for visitors' daily activities.

At the front of the building, clear glass walls are used as facade elements, allowing natural light into the space and creating a visual connection between the interior and exterior. This transparency supports the open and inclusive design concept.

The reception area becomes a focal point with the use of vertical solid wood partitions, which not only serve as an aesthetic element but also provide privacy without blocking the flow of light. These partitions enhance the natural character of the space.

On the ceiling, a combination of two main materials is used: gypsum with a white paint finish that functions as a clean and bright background, and a parametric ceiling made of wood that forms a dynamic and artistic curved pattern, presenting a warm and futuristic atmosphere.

For furniture elements, plywood is used for various pieces such as the reception desk, lockers, and service desk, providing a light and uniform look. Rattan is present in the chairs,

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adding a natural and traditional feel that blends harmoniously with the overall design. Furthermore, natural stone is also applied to the chair seats, providing a natural texture and material strength that contrasts yet blends well with the composition of the space.

With the right and diverse selection of materials, this lobby area succeeds in creating a friendly, comfortable, and functional atmosphere for library visitors.

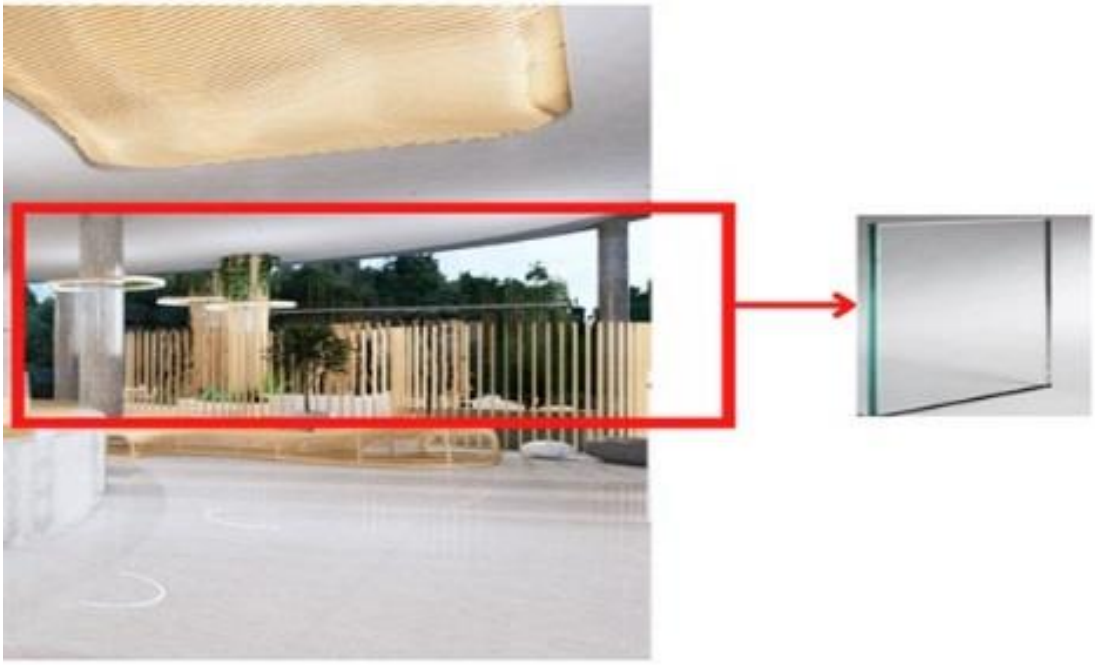

Figure 6. Natural Lighting in the Library Lobby
(Source: Authors, 2024)

The lobby of the Bandung City Archives and Library Service is designed with an open concept that prioritizes natural lighting for comfort and efficiency. This is achieved through the use of tall, large glass walls surrounding the lobby.

The clear glass material used allows maximum sunlight into the space, creating a bright, open, and refreshing atmosphere throughout the day. Not only does this glass wall enhance the quality of natural lighting, it also strengthens the visual connection between the interior and the exterior, broadening the perception of space and creating a more natural experience.

With this approach, the lobby area becomes not only a circulation point, but also a comfortable and welcoming transition space for every visitor.

3.2 Children's Reading Room

This space demonstrates efforts to create a fun atmosphere for children, but it still lacks optimal application of biophilic design principles. In terms of color, the dominance of bright colors like red, yellow, and blue does stimulate activity, but tends to be too contrasting and does not reflect calming natural colors like leafy green or earthy brown. In terms of materials, although there are wooden elements in the furniture, most surfaces still use synthetic materials like plastic, which reduces the natural connection between users and the environment. Meanwhile, lighting has not been maximized because closed curtains block the entry of natural light, and there is no visual access to the outdoors. Overall, this space has the potential to be improved by adapting more natural colors, using organic materials, and optimizing light and views to truly create a space experience in harmony with nature.

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Figure 7. Children's Reading Area of the Bandung City Archives and Library Service
(Source: dispusip.bandung.go.id, 2025)

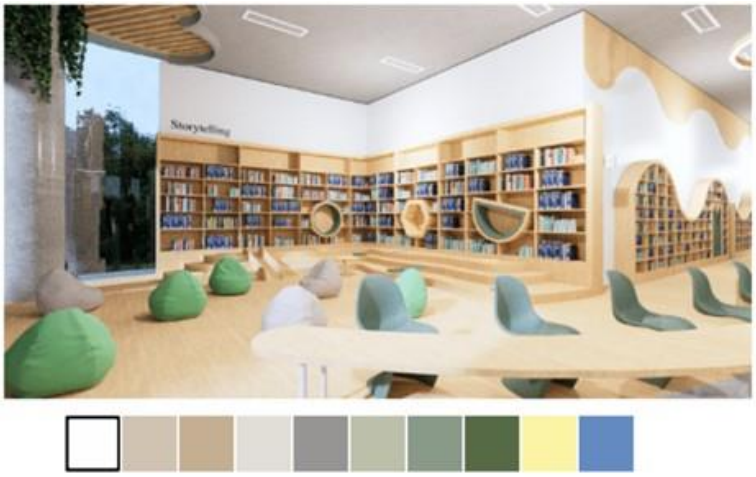

Figure 8. Colors in the Children's Reading Room
(Source: Authors, 2024)

The children's reading area at the Bandung City Archives and Library Service was specifically designed with the characteristics and psychological needs of children as the primary users of the space in mind. Therefore, the selection of bright and warm colors is crucial in creating a cheerful, active, and enjoyable atmosphere, in keeping with the childlike spirit, which is synonymous with joy and playfulness.

White and cream dominate the ceiling, with white as the primary backdrop to create a clean and bright impression, while the cream color comes from the wood elements, providing a natural warmth to the space. The children's reading room floor uses a light brown wood color, creating a natural and child-friendly feel, as well as providing comfort for sitting or playing on the floor.

On the walls, the combination of white and cream from the wood creates a soft, visually cohesive feel and blends seamlessly with the overall design. Green elements are also present through the use of artificial grass or vegetation, enhancing the natural feel and stimulating children's imaginations.

The children's reading room furniture is designed with attractive shapes and colors. Bright colors like yellow, green, blue, and red dominate the bean bags, chairs, and other interior elements. These colors have a positive psychological effect on children, promoting a happy mood, improving focus, and fostering a sense of comfort and security within the space.

Overall, the design of this children's reading area not only functions as a space for reading, but also as a place for exploration and growth that supports learning activities while playing.

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Figure 9. Materials in the Children's Reading Room
(Source: Authors, 2024)

The image above shows the implementation of materials in the children's reading area of the Bandung City Archives and Library Service, where the selection of materials was designed by considering safety, comfort, as well as a pleasant and educational atmosphere for children as the main users of the space.

The interior design of this space is dominated by wood, applied extensively to various elements of the space, including the walls, ceiling, and furniture. The ceiling is made of gypsum with a white paint finish, creating a bright and clean feel, combined with a wooden ceiling that adds a warm and natural touch to the space.

One of the room's walls received special treatment, using plywood finished with HPL. This element creates an interesting visual accent, presenting playful shapes and textures while still aligning with the active and dynamic nature of children.

For the flooring, given that children tend to be active, running around, and sitting on the floor, carpet was used as the primary covering. These carpets come in several types, including:

- Synthetic grass carpet as an educational and natural element,
- Wood-textured carpet that enhances the natural warmth,
- Gray carpet to balance the colors and create a soft, neutral feel

Furniture such as bookshelves, group seating areas, slides, work tables, and chairs uses plywood with an HPL finish, known for its durability and ease of cleaning. The seating area uses foam with a synthetic leather finish, a child-friendly material choice for comfort and easy maintenance in the event of spills or dirt.

The combination of all these materials not only strengthens the aesthetic and functional value of the children's reading room, but also creates an atmosphere that supports the process of learning and playing simultaneously while still prioritizing safety aspects and ease of maintenance.

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Figure 10. Lighting in the Children's Reading Room
(Source: Authors, 2024)

The image above shows the artificial lighting system in the children's reading area of the Bandung City Archives and Library Service. To support children's reading and other activities within the space, a general lighting system is used, evenly distributed throughout the area.

The type of lighting used is a fluorescent lamp mounted on the ceiling with a cool white color temperature, producing bright and cool light. This cool white light is ideal for study and reading spaces because it can increase concentration and alertness, and create a more focused and energetic atmosphere.

The lamp uses 40 watts of power, which is quite efficient while still providing optimal light intensity. The even placement of the lamps across the ceiling ensures consistent and comprehensive lighting throughout the room, without creating shadows or dark areas that could disrupt children's activities. With good and planned lighting, the children's reading area becomes a comfortable space and supports reading and play activities with clear, safe, and fun visuals.

3.3 Reading Room for Teenagers and Adults

The adult reading area does not yet fully reflect biophilic principles. The predominance of neutral colors like white and gray creates a monotonous atmosphere, while green accents don't adequately convey a calming, natural feel. The materials used are predominantly synthetic, such as metal, plastic, and laminate, lacking the warm sensory experience typically achieved by natural materials like wood or stone. While large windows allow natural light to enter, the use of frosted glass blocks visual access to the outside, reducing the sense of connection with nature. Optimizing natural colors, using organic materials, and opening up views to the outside would significantly enhance the biophilic quality of this space.

Figure 11. Adult Reading Area of the Bandung City Archives and Library Service
(Source: dispusip.bandung.go.id, 2025)

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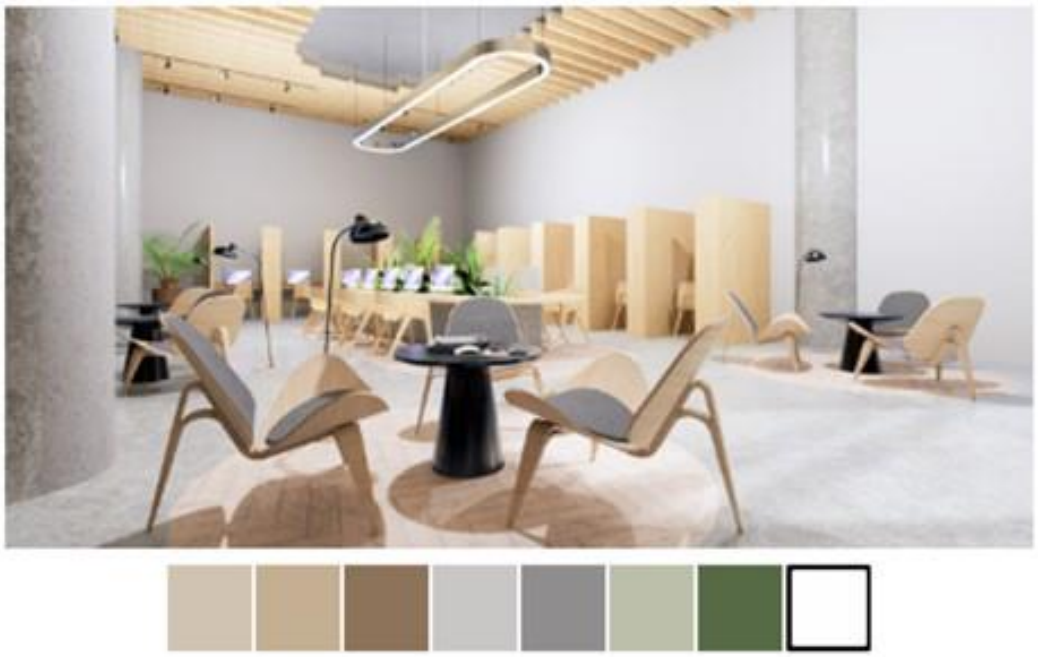

Figure 12. Colors in the Teen and Adult Reading Room
(Source: Authors, 2024)

The image above is a reading area for teenagers and adults at the Bandung City Archives and Library Service by applying dominant colors using neutral colors such as the use of white applied to the walls, the use of cream applied to the floor, ceiling and furniture, the use of gray applied to the floor, columns and furniture, and the use of bright colors as focal points in the room such as the use of green found in plants.

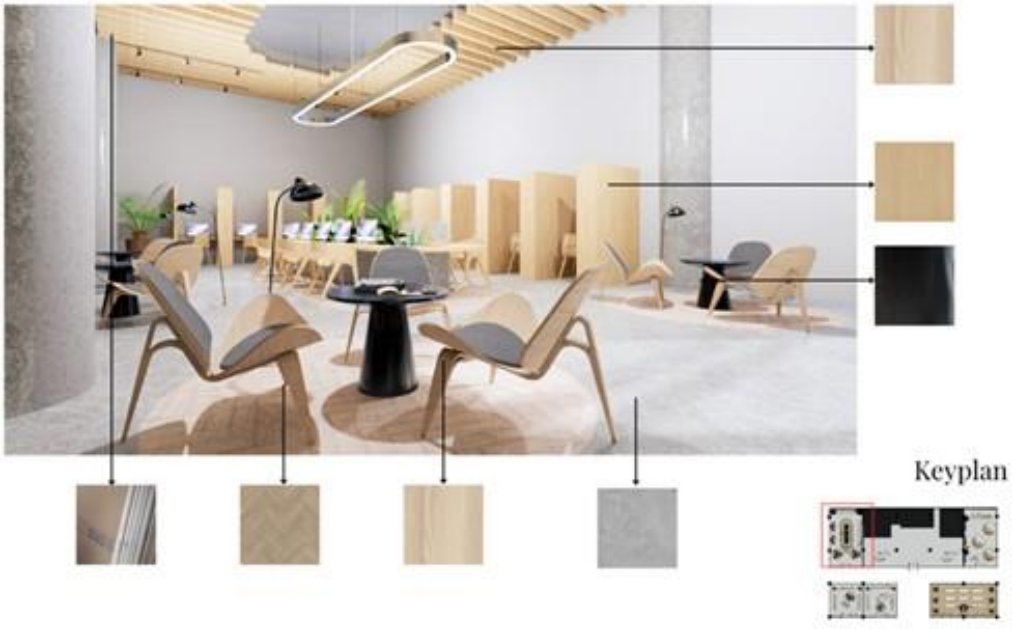

Figure 13. Materials in the Teen and Adult Reading Room
(Source: Authors, 2024)

The image above depicts the implementation of materials in a reading room for teenagers and adults, where wood is the dominant material. The ceiling uses rhythmic wood, creating an accent in the space, combined with gypsum and a white duco paint finish. The floor uses granite combined with parquet. The furniture in this room uses solid wood with suede upholstery, plywood with an HPL finish, and stainless steel for the lamps.

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Figure 14. Lighting in Teen and Adult Reading Rooms
(Source: Authors, 2024)

The image above is the implementation of natural lighting in the reading room for teenagers and adults where the walls of the room use glass material, the glass used is low-e glass, the aim is to minimize the light and temperature entering the room, the size of the glass on the walls of this library has a large enough size so that natural light can enter the room maximally, later the light will be received by the white ceiling and then the light will be distributed throughout the room so that during the day it will save electricity usage.

4. CONCLUSION

Based on the analysis of the new design of the Bandung City Archives and Library Service, it can be concluded that the biophilic approach is implemented through the selection of neutral colors inspired by nature, the use of natural materials such as wood, rattan, natural stone, and the integration of green plants in various areas such as the lobby, children's reading room, and the reading room for teenagers and adults. In addition, maximizing natural lighting through large glass walls, especially in the lobby area and the reading room for teenagers and adults, is one of the main strategies in this biophilic design.

Specifically, in the lobby area, the dominance of neutral colors and natural materials creates a warm and welcoming feel. In the children's reading room, the use of bright colors, wood materials, and synthetic grass carpeting aims to create a cheerful, active, and safe environment. Meanwhile, the reading rooms for teenagers and adults employ neutral colors with green accents from plants and wood materials, along with optimal natural lighting, to create a calm and focused atmosphere.

The implementation of these biophilic principles is expected to not only improve aesthetics and visual comfort, but also provide psychological benefits such as reducing stress, increasing focus, and strengthening connections with nature for library visitors. Thus, the design of the Bandung City public library with a biophilic approach has the potential to transform this public facility into a space that not only functions as a literacy center, but also as a recreational, educational, and regenerative space for urban communities. This research provides a practical contribution in applying biophilic concepts to library design in Indonesia, which is expected to inspire the development of other public facilities that are oriented towards human and environmental well-being.

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