

Open Space Design Elements and Social Support Design In Healing Facilities

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Abstract

This study suggested the environmental components for open space in a healing environment based on the social support approach for integrating and enhancing users' activities and interactions. The physical environments of the open space in healing facilities should be suggested by social support design and support the interactions of various users. Particularly architectural environment conditions should reinforce the contribution to the revitalization of medical facilities based on improving the healing effect of patients through mutual exchange of users. The open space environment conditions influence users' healing process with physical design factors and users' interactions, and the flexible environments based on the social support that is crucial for circulation and mutual exchange of users. The open space transformation, integration of technology, and wayfinding system with color and signage also allow users to improve the space experience and easy access. The environmental components of open space design should include easy access for user inflow, flexible layout for comfort, access to outdoor spaces, integration of warm color schemes for relaxation, personalization of spaces with artwork, and visual interest through the use of textures and materials.

Keywords: Open Space, Design Elements, Social Support Design, Healing Facility

1. INTRODUCTION

1.1 Research background and purpose

This study is to analyze the physical characteristics of the open space of a healing facility from the perspective of inducing and supporting user behavior. To this end, the concept of affordance approach was reviewed based on the literature, and environmental design elements for social support of design for users were analyzed. As in Christoph Schirmer's theory that an open space of a healing environment facility is important for a social service function that forms a community of users, an open space of a healing facility is built with various functions [1]. Contributes to social healing in the form of amenity surroundings that regards functional comfort. Open space is a mediating space that forms the movement flow of users and supports the exchange of experiences and affects overall satisfaction with the healing facility. Through this study, the concept of healing in modern society is defined, and the validity of social support using design through the characteristics of physical and environmental factors constituting an open space of a healing facility is reviewed as a concept of affordance.

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1.2 Scope of Study

In this study, the physical and environmental factors constituting the open space of a healing facility were reviewed with a focus on case studies. As a research method, the relationship of healing and the environmental factors of healing facilities were defined through a review of the literature and previous studies. Second, the relationship between the meaning of social support and environmental design elements of healing facilities was examined. Third, the relationship between the social support concept and environmental factors in healing facilities was defined, and the relationship between social support design and users was defined. Fourth, open spaces of healing facilities by type, and the characteristics of design elements in case studies were investigated and categorized by open space design principles. The physical boundary of the open space in this study was limited to a space in which the open to unspecified people such as the waiting areas, reception area, lounge, and hallway are concentrated. Case studies include New Lady Cilento Children's Hospital in Brisbane and The Royal Children's Hospital in Parkville.

2. A THEORY STUDY ON THE HEALING ENVIRONMENT

2.1 The relationship of Healing and Environment

Dr. Leland Kaiser mentioned the importance of a healing experience that combines spiritual, mental, and experiential methods for patients [2]. Figure 1 shows that the basic orientation of the healing environment interacts with the hierarchy at each level [3].

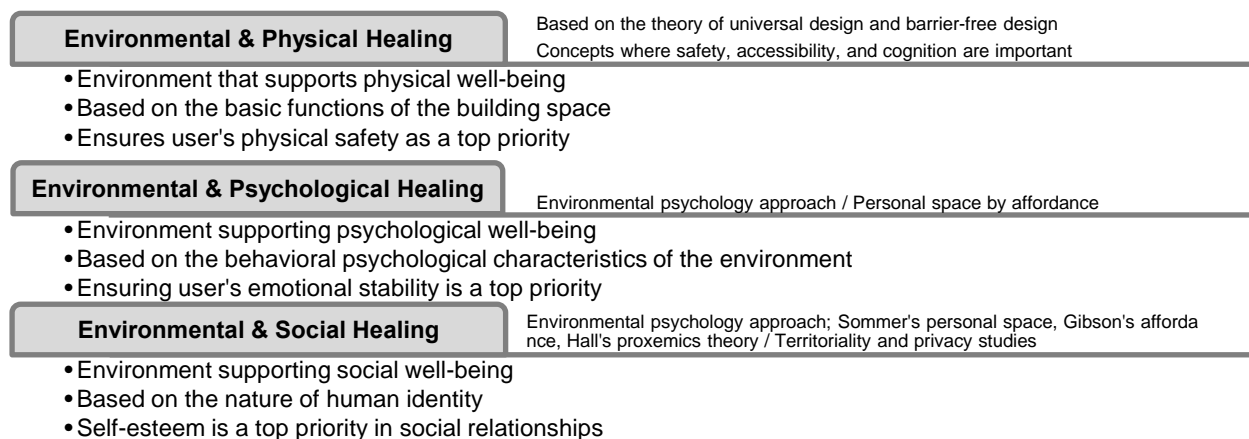


Figure 1. The Relationships of Healing and Environment Concepts

Lazarus and Folkman described the importance of social adaptation, including physical adaptation to the environment, an individual's psychological response to a situation, social functioning in a given role, and interpersonal relationships in the environment [4]. Jain Malkin categorizes the concept of healing as psychological, physical, and social healing, and defines psychological healing as a positive attitude toward life that is manifested by reducing anxiety, relieving stress, increasing self-confidence, and increasing emotional reactivity. He mentioned that social healing can be achieved through improved relationships with others, a sense of belonging, and support from family and friends [5]. The interaction for the patient's physical, psychological, and social functions are closely related to healing, and the environmental elements contribute to the resolution of the patient's social problems and needs. The quality of the environment needs to contribute to a positive healing effect by increasing the satisfaction in the physiological aspect of the patient and improving psychological satisfaction by providing visual and aesthetic comfort [6].

2.2 Environmental Factors for the Healing Facility

Tyson defined a healing environment means expanding support for social services that gradually form relationships with humans. He classified the factors of healing into human, environment, and interaction and suggested the paradigm of the healing environment as the interaction of individual needs, physical environment [7]. His theory implies the physical environment that supports the patient's social interaction is based on comfort, independence, freedom, privacy, ownership, space friendliness, and connectivity between internal and external spaces is proposed as an activity space. The conditions of the healing facility can be classified as support for positive physical environmental factors and social behavior factors for interaction between users. Physical environmental factors should provide natural factors and viewing environments to relieve users' stress and provide psychological stability. Particularly, it is required to provide a comfortable space for recovery by alleviating the patient's anxiety through the friendly composition and efficient spatial arrangement of the natural landscape, which exerts an important healing power for the patient's recovery. Social behavior factors for social support include acceptability, comfort, interaction, space perception, and human interaction with the environment. Through the arrangement of social and environmental elements and spaces such as nature experience space, face-to-face space, each floor arrangement, hospital room arrangement, and space for caregivers, users' voluntary behavior support and activities will be promoted. The support of these social behavior factors enables social exchange and interaction through open spaces for patients, families, and staff, family visit spaces, leisure spaces, nursing spaces, discourse spaces, hobbies spaces, and educational spaces and increases sociability and social healing. Table 1 represents the conditions of treatment facilities that were classified for this study.

Table 1. Conditions of the Healing Facility

Conditions	Factors	Concepts
Positive environmental factors	Individual needs	The elements protect privacy, increase self-reliance, increase sensory perception, safety, security, and personal approach to the community gardens
	Physical factors	Offers psychological stability by creating a physical environment with natural elements and views to relieve stress
	Behavioral factors	The concept of comfort, sense of space, interaction, acceptability, and support through human interaction with space Support the interactive behavior between the environment and users
Social support	Interaction	Promote patient's sociality with the support of voluntary actions, providing social environment elements; natural experience space, a face-to-face space, arrangement of each room and floor layout, and a space for caregiver participation in care

3. SOCIAL SUPPORT AND OPEN SPACE DESIGN

3.1 Social Support Design for Healing Environment

Sadler, DuBose, Malone, and Zimring [8] emphasized that creating a physical environment of a healing facility with a design for social support can ultimately enhance the healing effect. Marcus proposed a physical environment for social healing, focusing on the need for a social support design method approach in his research [9]. Ulrich emphasized the introduction of natural elements and the effect of changing the surrounding atmosphere in the healing environment and emphasized the importance of treatment using the patient's social support [10]. He revealed that meticulous attention to the individual contributes to relieving the patient's stress and that environmental control that can relieve stress, social support, and positive distraction using physical environmental factors are important factors for social support of design. The concept of social support design is defined as social support for user interaction behavior using physical environmental factors such as space



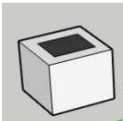

composition and furniture arrangement. It is essential to support social exchange by providing a space for social exchange activities and this social support design will have a positive effect on the healing and recovery of patients.

3.2 Open Space Types in Healing Facility

The provision of open spaces that support the separation of private and open spaces in healing facilities is a complex design that organically connects the internal and external environments. The open space is the most exposed to the public in the healing facility and it performs the functions of access, circulation, and distribution.

Koh Young-jong and Lee Jong-man revealed in their study that the open space of a healing facility is construction [11]. The hospital street in healing facility, where the user's moving line is the main movement axis and the spatial area is separated by function, can be said to be the concept of an open space in which the functions of the space are mixed while minimizing the congestion of access [12]. The open space is linked with Hospital Street as the central space of the healing facility, enriching the patient's spatial experience and improving the quality of the healing environment by actively accepting the natural environment. The high floor height and open structure also perform the function of heat buffering and natural ventilation using airflow conversion. Soyoung Lee classified the structural forms of open spaces in healing facilities into Horizontal, Vertical space, Atrium, and Individual space types, and Table 2 presents the characteristics of the space types [13].

Table 2. Open Space Types in Healing Facility

Space Type (shaded area)		Structural Features
Horizontal structure type (H-type)		Greenhouse type structure Facade with transparent-material
Vertical structure type (V-type)		Applicable to large-sized buildings Excellent effect of internal lighting effect
Atrium structure type (A-type)		Atrium structure at the stylobate part in the lower building area Relatively small volume mainly for the infirmary in the upper part
Individual structure type (I-type)		An independent functional space in a low-rise building

3.3 Open Space Design Principles in Healing Facility

Recently, as many medical facilities pursue a space design that considers 'patients as consumers', the importance of open spaces in healing environments is emerging. Open spaces, which contribute to the patient experience and brand awareness, provide visibility into information sources such as appointments, care-related inquiries, such as waiting seating, patient privacy, and providing a space for families and groups to gather. Space flexibility and transformation are required to provide a more functional and intuitive open space in healing facilities. The key components to improving the patient experience are required, and principles are needed for transforming existing facilities or designing new open spaces that emphasize patient satisfaction and convenience. Solution conditions for medical reception design are as follows. First, open space design in healing facilities needs to understand the value of user experience, make it easier for patients to navigate the

facility, and provide a clear view of important information sources. The reception area should contribute to the patient experience and brand awareness. It is necessary to provide a reception space that privatizes the waiting area to make patients feel comfortable and to include wayfinding signage to make it easier for users to navigate. Second, open space transformation is required to provide a more functional and intuitive reception space. The custom design of the reception desk, contrasting finishes, and color variations should allow visual guidance for users to the facility through the facility. Waiting rooms or seating areas should be placed away from constantly crowded reception areas to provide safe privacy where users feel comfortable. The reception and check-in desks should provide visibility into information sources with waiting for seating, patient privacy, providing a space for users to gather. This spatial arrangement helps the receptionist perform the function of protecting user information as he/she handles confidential patient-related information. Third, the comfortable reception and waiting areas, as well as the comfort due to the maintenance of an appropriate room temperature, provide psychological stability to the patient. It is necessary to strategically place air conditioners on the ceiling, use comfortable chairs, soothing colors, and artwork to reduce stress and provide pleasure during waiting times. Fourth, to reduce users' waiting times, many check-in kiosks and computer systems should be provided. For users who find it difficult or are unaware of how to use electronic systems in healthcare facilities, at least one staff member should reside in the reception area to provide both user guidance and answers to questions [14]. Table 3 shows the open space design elements of the classified healing facilities.

Table 3. Open Space Design Components in Healing Facilities

Factors	Space Function		Design Components
Individual needs	Comfort	Adjustment of the environmental control system	Floor layout / Infirmary layout / Furniture / Storage / Color / Lighting / Interior finishing / Material texture / Pattern
	Territoriality	Symbolic possession of physical space	Community- garden / Promenade / Lounges with View
	Private Space	Individuality and safety	Waiting area / Furnishing arrangements / Furniture style
Behavioral support	Natural Elements	Psychological stability	Indoor and outdoor landscape / Nature in walking path / Garden space
	Symbolism	Utilization artworks and visual images	Artwork displays / Virtual reality image
	Openness	The open layout of space	Entry and exit planning / View / Exposure
	Accessibility	Destination ease of reach	Easy entry & exit / Entrance / Wayfinding / Circulation flow / Space linkage / Exterior view window
Interaction	Public and Social Exchange	Space for family and visitors Users' social interaction and environmental adaptability	Space provision for lounge / Leisure, exercise, hobby, education and nursing space
	Information Exchange	Easy accessibility for information	Easy device operation / Offering Internet connection / Useful information

4. CASE STUDIES OF OPEN SPACE COMPONENTS IN HEALING FACILITIES

New Lady Cilento Children's Hospital is a specialist pediatric teaching hospital providing tertiary and quaternary health services to patients across Queensland. In its form and massing, the conventional model of podium and tower delivers a medium-rise, sculpted building with landscaped roofscapes and incorporates the most advanced communication, interventional, and mutual spaces by incorporating the coloration of the native *Bougainvillea* plantings in the adjacent parklands. The Royal Children's formal space arrangement has been

assembled to promote internal and external spatial experiences for users. Also, a special approach was paid to the textures, forms, and colors of the surrounding environment and how this could directly inform the material expression of the building. Both facilities' design strategies and a detailed architectural study indicate how the built environment infused with the experience of mutual space and nature can apply to users and help provide a positive effect for users visiting the hospital.

4.1 New Lady Cilento Children's Hospital

New Lady Cilento Children's Hospital is the twelve-level 95,000m² is specialist pediatric in Queensland with a brightly colored exterior, incorporating the green and purple coloration of the native *Bougainvillea* plantings in the adjacent parklands. In its form and massing, it delivers a medium-rise, sculpted building with landscaped roofscapes and it uses a salutogenic approach, incorporating design strategies that directly support patient health and wellbeing attributes such as clear wayfinding, connections to the outside, views of nature, and providing a green and sustainable environment for patients and staff. The design concept is the idea of a 'living tree' and a network of double-height spaces-branches radiating from two vertical atria in the center of the plan. The vertical and horizontal spaces in the tree form comprise the principal public circulation system in the hospital. The branch spaces serve to connect inside and outside and bring natural daylight into the building. The branch spaces extend beyond the street lines to form a series of framing portals and external balconies where users can view the city. Each branch is oriented toward a key landmark in the surrounding the high-rise buildings of central Brisbane, to the adjacent parklands, to the distant mountains, and to the Brisbane River. Two and three-dimensional art is used extensively throughout the building to promote patient wellbeing and rooftop gardens, green walls, enclosed courtyard gardens, and views to surrounding parklands all form part of the hospital's healing environment. Access to green space is a key element of the design and the green roofs on the upper levels are used by patients, families, and staff for passive and active recreation and are also used as part of the hospital's rehabilitation programs. The colors used on the outside and inside of the hospital's public spaces are derived from the colors of the Queensland landscape including neutral color tones with the vibrant colors of the State's exotic birds, rainforest butterflies, and flora [15].

4.2 The Royal Children's Hospital

The Royal Children's Hospital has been assembled to promote internal and external spatial experiences for users with the building's formal arrangement. The building has been split into a campus masterplan with a central street joining major new public gardens to the north and southwest. According to the natural slope of the site, new facilities could link to the park at three different levels intertwining the hospital with its park setting. The co-location on the campus of clinical, research, and education elements are an important feature of this design. A special approach was applied to the natural textures, forms, and colors of the park directly informing the material expression of the building. The avoiding a 'front and back' building façade is light-filled with landscaped gardens around their full perimeter, enhancing the connection between user and park by providing for entering abundant natural light to all corners of the hospital. A significant and identified building feature is the colored 'leaf' blades which are fabricated in curved panels creating a shimmering organic structure, and they protect the building from the sun. At the center of the facility, the six-story atrium and Main Street links the elements of the hospital together through a naturally lit public thoroughfare with views of the parkland. The Main Street features a two-story coral reef aquarium, large-scale artworks, a meerkat enclosure, and a range of places to eat and meet partnerships with the zoo, science museum, and cinemas have resulted in leisure activities for all ages groups. Inpatient Building is designed in a star shape, connecting the rooms to the park and more than 80% of the rooms have park views or courtyards and specially designed glass sunshades on the hospital's exterior make patients allow to view the ground garden [16].

Table 4. Open Space in Lady Cilento Children's Hospital




Image & Type	Factors	Space Function	Design Elements	
	Individual needs	Private comfort	Floor layout / Infirmary layout / Lighting	'Salutogenic' approach incorporating design strategies
		Territoriality	Community- garden / Promenade	'Living tree' design concept applied for building structure
		Private space	Arrangement of sitting furniture /	Framing portals and external balconies with view
	Behavioral factor	Natural elements	Indoor & outdoor landscape / Garden space	Rooftop gardens, green walls, enclosed courtyard gardens and views to surrounding parklands
		Symbolism	Art exhibition /	Two and three-dimensional art using symbolic colors
		Openness	Entry & Exit planning / View / Exposure	Podium and tower structure with view extension
	Interaction	Accessibility	Wayfinding / Circulation flow / Space linkage	Clear wayfinding, connections to the outside & connections to the outside
		Public and Social exchange	Lounges / Arrangements Leisure space	The vertical & horizontal spaces in the tree form comprising principal public circulation system Sustainable environment for patients and staff
		Information exchange	Useful information / Simple device	The green roofs on the upper levels for recreation and rehabilitation programs

Table 5. Open Space in The Royal Children's Hospital

Image & Type	Factors	Space Function	Design Elements	
	Individual needs	Private comfort	Adjustment of the environmental control system	Exterior glass sunshades with the view from the patient's bed / 85% of single-occupancy bedroom spaces designed befitting for recovery and respite
		Territoriality	Symbolic Possession of physical space	Masterplan with a central street joining major public gardens
		Private space	Individuality and safety	More than 80% of the rooms have park views
	Behavioral factor	Natural elements	Psychological stability	Natural light to enter the hospital The natural slope of the park setting site
		Symbolism	Using artworks and visual images	Colored 'leaf' exterior blades shimmering organic structure
		Openness	Open layout of space	Light-filled landscaped gardens enhancing the connection between child and park
		Accessibility	Destination ease of reach	Avoiding a 'front and back' makes it easy to access from garden to the hospital

	Interaction	Public and Social exchange	Space for family and visitors Social interaction and environmental adaptability	Six-story atrium links the elements of the hospital with the view A two-story coral reef aquarium/Large-scale artwork/A range of places to eat and meet with family, colleagues, or friends
		Information exchange	Easy Access and Information Exchange	Partnerships with the zoo, science museum, and cinemas for popular activities for users

5. DISCUSSION

The design strategies of Lady Cilento Children's Hospital use a salutogenic approach, which has resulted indirectly in supporting patients' health and wellbeing by providing easy wayfinding, connectivity to the outside with views of nature, and providing a sustainable environment for patients and staff. The natural motif design concept is represented in the main open space which is composited with vertical and horizontal forms comprising the principal public circulation system full of natural light in the hospital. The integrated design solution in The Royal Children's Hospital provides the architectural approach to increase the environment infused with nature experience physically and visually. It has benefited from the therapeutic effects of visiting the hospital with innovative design principles to promote inside and outside spatial experiences for children and their families. The open space is connected to the landscaping of the garden with the main pedestrian path as the main axis, and the visual symbol of the space provides psychological comfort to users and offers the founding of an affirmative image of the healing facility. It contributed to improving the psychological healing effect of long-term users by providing an inflow path to the hospital room combined with natural elements, a lobby and terrace structure, and a walking path that leads directly to an outdoor garden. The open space of the case facilities was providing social exchange and information exchange services between patients and staff as well as content to support various interactions of users such as leisure time, sports activity, walks, and visits. The various forms of open spaces are equipped with visual openness, artworks, lighting, flexible furniture forms and arrangements, and various services to provide positive contributions to users' satisfaction and healing effects.

6. CONCLUSION

The major purpose of open space in the healing facility is to support the actions of various users and to link the users' circulation to the destination space. User interactions in healing facilities contribute to stress reduction, and recovery from physical ailments and relate to patients and their families and the public. An open space using social support design meets the requirements of various user groups who use medical facilities, contributing to the revitalization of medical facilities and improving the healing effect of patients through mutual exchange of users. Creating an area for the open form with atrium, vertical, horizontal, and individual space accommodating circulation flow functions the environmental components of open space design should imply easy access for user inflow, flexible layout for comfort, access to outdoor spaces, and integration.

The major object of open space in the healing facility is to offer the interactions of various users and to link the users' circulation to the destination space. An open space in healing facilities using social support design must support the requirements of various user groups who use medical facilities, contributing to the revitalization of medical facilities and improving the healing effect of patients through mutual exchange of users. Creating an area for the open form with atrium, vertical, horizontal, and individual space accommodating circulation flow functions, providing a link that allows entry and exit from inside and outside, and suggesting natural surroundings. The environmental components of open space design should include easy access for user inflow, flexible layout for comfort, access to outdoor spaces, integration of warm color schemes for relaxation, personalization of spaces with artwork, and visual interest through the use of textures and materials. Therefore,

first, open space in healing facilities should provide visibility into information sources with space transformation required to provide a more functional and intuitive reception space and it should provide safe privacy where users feel comfortable. Second, open spaces in healing facilities should provide comfortable reception and waiting areas with adjustment of the environmental control system and natural elements. Third, integrated advanced technologies for check-in systems should be provided to reduce the waiting time. Fourth, open space design in healing facilities needs to provide a reception space that privatizes the waiting area to make patients feel more comfortable and to include signage and color scheme to make it easier for patients to navigate the area.

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