

The sustainable space planning of hospital design towards the healing environment

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ABSTRACT

This research is to review the recent Korean hospital design. Sustainability built environment issues have become one of the hottest agenda. Sustainability can mean both sides of the technique and user's psychology. The possibility of environmental sustainability is enhanced by interacting between users and space. The interrelationship between users and space service is becoming the focus as the meanings of space are extended. The meanings of hospital space were limited to such as accommodating and diagnosing patients, and medical care, however, the extended meanings include a precaution, rehabilitation, and supporting health service. The purpose of this research is to examine the space planning program and its influence from psychological view after analyzing the psychological and internal elements for hospital space design rather than the technical and external elements. We need to understand that hospital space is a social organism which has been changing as the medical environment and the user's request. In a hospital, there are people of every class, and also all kinds of social behaviors happen simultaneously such as a birth, a death, cure, education, research, a life, management, etc. The development of software for the effective space planning can maximize the sustainability of healthcare facility. This research examines how the space design interacts with users and also how the recent Korean hospital design reflects the influence. This study suggests the standard of hospital interior design for sustainability environment considering Psychosocially Supportive Design. The processes of this study are as follows. First, this study examines the present state of hospitals' Psychosocially Supportive Design. Second, this study analyzes how psychosocially supportive design affects on users' psychological emotions.

KEYWORDS: The sustainability space planning, hospital design, psychosocially supportive design.

1. INTRODUCTION

The sustainability of health facilities has been important augments. The scale and the meaning of hospital architecture have been extending continually as a social organism. And it is also the high level technological contracture. The sustainability of hospital environment can be explained from both physical perspective and psychosocial perspective. Physical environment focuses on energy resource as eco organism. Psychosocial environment is based on interaction between human and space and identifying wellness factors that maintain and promote health. Understanding of hospital design is significantly correlated with the user's fundamental needs. It can create supportive physical environment. A hospital which is the healing environment has to consider patients psychological, social and spiritual needs. That is the reason why this paper is to focus psychosocially supportive design for sustainability environmental qualities.

Figure 1 shows the processes of sustainability environmental qualities. Composing the functional space programs, good designing and supplying the social programs are prerequisites for healing environment of hospital. The functional and potential space programs can emphasize the sustainability of hospital. Using the suitable design elements can enhance the healing environment. Supplying social programs environmentally can raise the interaction between human and space. ASHRAE(2008) has defined indoor environment that human now live and work inside these boxes up to 90 percent of the time. Lawrence W. Green(1999) has defined health as a condition where resources are developed in the relationship between humans and their biological, chemical, physical and social environment. Lawrence(2003) suggested EIA(enhance environmental impact processes) as a form of environmental management. And he defined environment from view points of various angles such as physical, chemical, biological, ecological, human health, cultural, social, economic, built, and interrelations. Robert et al. (2002) said the reason germ theory is an incomplete explanation of human's illness and disease is because it ignores the contribution of numerous physical and social dimensions of the environment that can affect health. Psychosocial environment which can make interaction between human and space is as much as important as physical environment for sustainability environment. The space is used by users and it has psychosocial effects on users. Forming psychosocial identity in space can maintain sustainability environment.

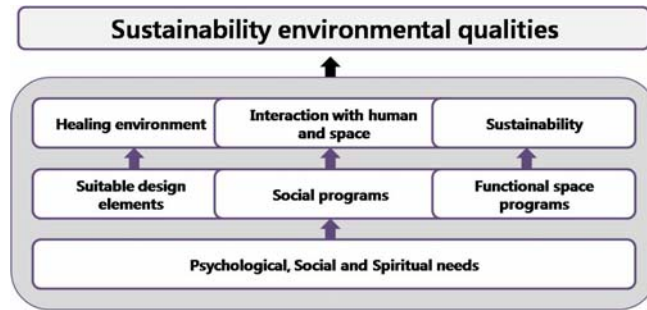




Figure 1. The processes of sustainability environmental qualities

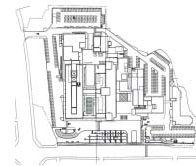
The purpose of this paper is to highlight the psychosocially supportive design for sustainability environment in the indoor environment of recent Korean hospitals. The subjects of this study are three Korean hospitals which were built recently. (Table 1) The indoor design of Seoul St. Mary's Hospital aims the advanced technological medical facility with nature and human touch. Jeju National University Hospital is designed as friendly hospital with lighting and garden, and its low structures give the emotion of safety and cozy as like the resort. The goal of Korea University Guro Hospitals' design is to establish the strategy for improving medical service environment.

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Table 1. Case studies in the recent Korea hospitals

Name	Ref.	Scale	Beds	Structure	Site area	Floor area	Location	Year	Site
Seoul St. Mary's Hospital	SMH	22 Stories & 6 Basements	1,085B	R.C., S.R.C.	110,293 m ²	325,428 m ²	Seoul	2009	
Jeju National University Hospital	JNH	5 Stories & 2 Basements	506B	R.C.	141,579 m ²	69,175 m ²	Jeju	2009	

Korea University Guro Hospital Extention	KGH	9 Stories & 4 Basements	864B	R.C., S.R.C.	35.859 m ²	79.016 m ²	Seoul	2007
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2. Psychosocially Supportive Design

Dilan(2009) explained that the aim of psychosocially supportive design is to stimulate the mind in order to create pleasure, creativity, satisfaction and enjoyment. There is an important relationship between an individual's sense of coherence and the characteristics of the physical environment. Nowadays, when health is defined, salutogenic perspective is more applied rather than pathogenic perspective. The holistic viewpoint enhances multiple dimensions of health, including the physical, psychological, emotional, spiritual and social treatment. A designer has to consider psychosocially supportive design for hospital design with understanding of patient's various statuses. A hospital has to be planned with good design elements and also support user's positive experiences. It can optimize health –promoting environmental effects. Having positive experiences can give comfort to patients, and promote their health. Healing environment can be accomplished by psychosocially supportive design which promotes sustainability environment. Sustainability environment would bring the quality of life, and it will eventually enhance healing environment.

Figure 2 illustrates TMPSD(Theory Model of Psychosocially Supportive Design) which shows the tangible relationship between positive experience and environment. This tangible relationship can give users a comfort and good health; therefore, users would be satisfied. And when users are satisfied, it would maintain sustainability environment.

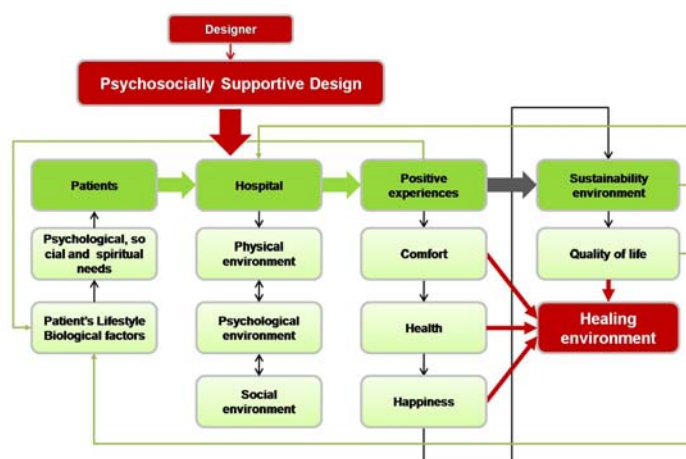


Figure 2. Theory Model of Psychosocially Supportive Design

2.1 The design elements for TMPSD

This paper analyzes the design elements which can affect on user's psychological emotion. The design elements are divided into 8 categories which are Nature(NA), Windows and Lighting(WL), Colour(CL), Land mark and Symbol(LS), Sound and Music(SM), Art and Atmosphere(AT), Rest and Crowding(RC), and Social and Service(SV). This study verifies how those analyzed design elements

affect on the atmosphere of hospital and the spatial meaning. According to 8 categories, specific design items of those three hospitals are analyzed. (Table 2)

Farrow(2008) enhanced designing strong links to nature and said that patients wants that something alive in the space. He also mentioned that wood and glass were good elements to allow deep penetration of light and enhance the comforting perception of the hospital. Altman(1975) defined the relationship between the physical and social environment and behavior . He enhanced understanding the interrelated issues involving personal space, territoriality, and crowding for understanding those relationship. Venolia(1988) defined healing environment. She explained that music is a powerful tool that is increasingly used in healing and extreme sustained silence is unnatural to us as constant noise. She illustrated that water provides myriad opportunities. A bubbling fountain or splashing waterfall make soothing sounds. . Dilan(2009) illustrated colour, window, and art. He explained that colours can possibly affect the brain’s activity and create a sense of wellbeing and originality within architecture. Colours can also have symbolic value and building’s identity. He also explained about window, which can have positive health outcomes on patients and contribute by allowing fresh airand daylight to enter as well as providing a view. He mentioned that art experience can help the person to restore homeostatic balance.

Table 2. Psychosocially Supportive Design

	NA	WL	CL	LS	SM	AT	RC	SV
SMH	Wood panel, Aquarium, Roof garden, Fountain wall, Indoor garden.	Atrium, Indirectness	Pastel colours, Various colour fabric and synthetic leather, Colour therapy.	The LED lighting shaped as cross, Madonna, Bronzed art wall	Sound absorption panels	Patterns like leaves or petals on the floor, Pink point fabric.	Wide window of ward lounge, Advanced cafe atmosphere	Minimize copper, one-stop service, Corporate Health Promotion Center - as an independent space
JNH	Indoor garden, Roof garden, Courtyard (Paediatrics’).	Atrium	Complementary colour schemes(Paediatrics’), primary colors		Concert Hall	Art gallery (corridor)	Glass Curtain wall (Ward), Advanced cafe atmosphere(Health Promotion Center)	one-stop service , various cultural events
KGH	Roof garden	Atrium	Similar colour schemes of warm colours, Using complementary colour schemes of Pastel colours contributes spaces.	Atrium.		Art wall with skylight, Art gallery	Extension of area per bed	One-stop service, one-day care, TLA(TLA Total Laboratory Automation System),Sports facilities and childcare for staffs.

Note) SMH= Seoul St. Mary’s Hospital, JNH= Jeju National University Hospital, KGH= Korea University Guro Hospital Extension, NA=Nature, WL=Windows and Lighting, CL=Colour, LS=Land mark and Symbol, SM=Sound and Music, AT=Art and Atmosphere, RC= Rest and Crowding, SV= Social and Service

This paper analyzed how specific design items affect on users’ psychological emotions as shown in Table 3. Table 3 shows the detailed effects of each element on users’ emotion. Table 3 classifies indoor design elements of recent Korean hospitals and analyzes those elements which are compared with experiential elements of previous researches and indoor design principles.

Table 3. Indoor space planning elements for user's Psychosocial positive experience

		Comfort	Safety	Convenience	Sociality	Territory	Privacy	Accessibility	Dynamic	Energetic	Eco-friendly	Interaction
NA	Roof garden	●			●	●		●			●	●
	Indoor garden	●	●	●	●	●		●		●	●	●
	Aquarium	●				●		●	●	●	●	●
	Fountain				●	●		●	●	●	●	●
WL	Atrium	●							●	●	●	●
	Indirectness	●				●				●		
CL	Pastel colours	●				●	●	●	●	●		●
	Various colour fabric and synthetic leather	●			●	●			●	●		●
	Colour therapy	●							●	●	●	●
	Complementary colour schemes					●	●			●		●
	Similar colour schemes					●	●			●		●
LS	The LED lighting shaped as cross									●		●
	Madonna				●							
SM	Sound absorption panels	●	●	●			●					
	Concert Hall				●				●	●		●
AT	Patterns like leaves or petals on the floor		●	●	●	●		●	●	●	●	●
	Art gallery	●			●			●	●	●	●	●
	Art wall	●			●			●	●	●	●	●
RC	Wide window	●		●	●	●	●	●	●	●	●	●
	Advanced cafe atmosphere	●	●	●	●	●	●	●		●	●	●
	Extension of area per bed	●	●	●		●	●	●		●		
	Minimize copper	●	●	●		●	●	●				
SV	One-stop service	●		●			●					●
	Health Promotion Center - as an independent space	●	●	●	●	●	●					●
	Various cultural events	●		●	●			●	●	●		●

Note) NA=Nature, WL=Windows and Lighting, CL=Colour, LS=Land mark and Symbol, SM=Sound and Music, AT=Art and Atmosphere, RC= Rest and Crowding, SV= Social and Service

This paper shows nature elements for space design in recent Korean hospitals generally. The atriums which are good nature elements for hospital indoor space were placed in those hospitals. The roof gardens which are good space for users' comfort were also placed in those hospitals. The roof garden is good space for user's comfort. All of hospital planned colour design properly into space. It can stimulate user's positive emotion. As hospital is requested high technical function, the improvement of treatment system which is the one-day care, can maximize user's satisfaction. It is common that art works are placed in recent hospitals.

3. CONCLUSIONS

As a result, this study suggests following features. This study's suggestions can maintain the sustainability of hospital environment as analogizing the psychosocial influence of recent Korean indoor design elements. This study suggests a design standard for sustainability environment of

hospital. With this standard, designers can plan the hospital indoor design considering the psychosocial effects of design elements rather than intuitive choices.

1. Hospital design has to be planned with nature elements (plant, water, and light) into indoor space carefully.
2. Hospital design has to be considered crowding.
3. Hospital design has to be coloured properly. Colouring is good method to improve the psychosocially supportive design for hospital
4. Hospital design has to promote the cultural events.
5. Hospital design has to be installed symbolic landmark.
6. Hospital design has to be concerned illumination properly.
7. Hospital design has to be concerned Minimize copper.
8. Hospital design has to be planned with art works to stimulate user's emotion

Hospital design has to extend with interrelationship between space and human for sustainability environment. As Improving physical environment is important for function and Convenience of space, improving psychological environment is also important for users' satisfaction. Psychosocially supportive design of hospital can bring healing environment eventually. This study suggests the one hospital interior design standards for sustainability environment considering psychosocially supportive design. In near future, researches on the practical usage of psychosocially supportive design and the analysis of the POE (Post Occupancy Evaluation) are expected based on this study.

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