



A framework for supporting humanistic design in health-care facility environments

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ABSTRACT:

Humanistic design is the creation of environments for the human being that focus on feelings in order to fulfill the mental, emotional and spiritual needs due to their effect in reducing tension and supporting reinforcement, stimulation and response. The need to humanize health care buildings has emerged clearly in the past decades. In addition, the principle of focusing on the patient in the design of health care buildings has had the greatest impact on the quality of the health system, as the patient's experience has become of utmost importance in the whole health care system.

Since the early 1960s, environmental psychology has been found to interplay between architecture and psychology. Environmental conditions act as a direct reason behind stressful reactions and emotions such as anxiety, fear, anger and emotions affecting all aspects of performance, spirit, and physical health. In addition to environmental conditions, social environment has been incorporated into environmental psychology due to its effect in supporting human soul.

This study aims to focus on the patient and his experience within the hospital and health care facilities in light of the psychological impact, rather than the economic aspect, as the patient suffers from many psychological problems in the hospital. The research follows the inductive approach, as it studies and analyzes the environments of different health care buildings that take into account the mental, emotional and spiritual aspects of the patient and support humanistic design in terms of the user's pleasures, needs, and care.

The research contributes to developing a framework that enhances the humanistic design in hospitals that includes different environments to create mind-blowing, inspiring and sense-stimulating architecture and open the way for many studies to probe into the environments of health care facilities.

Keywords: *Humanistic design, Environmental psychology, The patient's experience, the mental, emotional and spiritual aspects.*

1. Introduction

The concept of humanistic design has been increasingly recognized in the twentieth century. Since the environment affects the human spirit, the design of spaces puts the person within an enjoyable environment. In addition, it creates an architecture with functional requirements that blows the mind, inspires and stimulates the senses through designing aesthetic architecture as well as integrating nature.

The language of human medicine implies a long history of good medical care and relationships between medical care practitioners, patients and societies, and it is mainly related to humans. The question is what makes us human? It relates to topics such as human rights, identities, emotions, creativity, sentiment and culture. (Bates, 2018)

The principle of focusing on the patient in the design of health care buildings has the greatest impact on the quality of the health system. While the indicators of this principle must respond to the expectations of the patient and establish the patient's experience of care in the patient's relationship with the physician in terms of care, communication and understanding, other indicators are related to the principle of focusing on the patient, which is accessibility to services for a psychological impact rather than just for an economic or financial purpose.

The fulfillment of the patients' requirements raises the feeling of care and helps in treatment. Among these requirements is the provision of services necessary for the social relations between patients, the requirements of care, as well as the caregivers who encourage the patient to return to a normal life. (Setola & Borgianni, 2016)

Thus, in the era of health care reform, the patient's experience has become of utmost importance as comprehensive health care -integrative medicine- takes into account the physical, mental, emotional and spiritual needs of the patient. (Lambert P. D., 2016)

2.Humanistic hospital design

Humanistic design is the creation of environments for humans. Humanization of architecture is the value of people above everything; particularly, within the context of a coexisting community where a permanent follow-up of the human being and the consequences is conducted.

Humanity is a common aspect that connects all the people. Therefore, the physical manifestations must be taken into account in terms of scale, complexity, or purpose, and they must not go beyond the limits of the human story. Nonetheless, the emotions resulting from the experience of the place are able to understand that instinctively (Germishuizen, 2010). Environmental stress is the emotional, cognitive, and behavioral responses to an environmental stimulus. Bilotta and Evans (2013) define it as an imbalance between environmental requirements and the response capabilities of the human being (Fleury-Bahi, 2017).

Nowadays, the language of humanism has spread among health care designers, as these ideas have resulted from political and social aspects in the first place. The design of a humanitarian hospital requires creating environments that focus on the feelings as well as the psychological satisfaction and comfort of the patients with the aim of rapidly improving health conditions while using different methods of distraction from the hospital environment to raise their spirit.

3.The humanistic environments

The physical environment provides cognitive, physical and spiritual support through the patient's ability to experience healing (MacAllister, 2016). The patient's healing experience is defined as the relationship of the person's experiences and the environment. Such experience depends on what the person observes, thinks, desires, or gets. (Khan, 2014)Therefore, humanistic design is the creation of human environments (Germishuizen, 2010). These environments are divided into 3 aspects:

- An environment that supports spatial and cognitive awareness
- An environment that supports the patient's spirit
- An environment that supports caregiving and respect

3.1. An environment that supports spatial and cognitive awareness:

The surrounding environmental factors may reduce nervous stress and pressures. The Austrian scientist Hans Selye defined the word stress as the feelings of discomfort and anxiety that are generated in the body while trying to adapt or deal with elements of the stressful environment (Kowaltowski, 1981) Therefore, a comfortable, satisfactory and easy movement design is required. Hospitals should provide functional capacity to reduce stress, encourage healing and recovery, and enhance safety and accessibility (Bates, 2018). This is done through the following:

▪ Humanistic spaces:

A humanistic space deals with the human scale, is small and familiar, and has physical characteristics that follow human nature and give a sense of family life, which makes the place less stressful and anxious by abolishing the institutional character of the surrounding environment (De Vos, 2006) in the presence of homelike environment such as small family gatherings. A homelike space experience reduces the scale in hospitals, which efficiently creates a pleasant sense of size and a welcoming atmosphere without institutional feelings. (Bates, 2018).

These spaces give a sense of care and comfort and contribute to the innate healing process, which is the process of reform and recovery and a return to the completeness of the mind, body and soul (MacAllister, 2016)

▪ Way finding and accessibility:

The physical setting is the first impression of the patients in health care buildings and an important element in their perception of the quality of care and their overall satisfaction. Finding the way is the process of solving spatial problems while moving from a point to another. It includes mental processes that take place through mental and cognitive awareness and begins with the importance of having a landmark to facilitate knowledge of

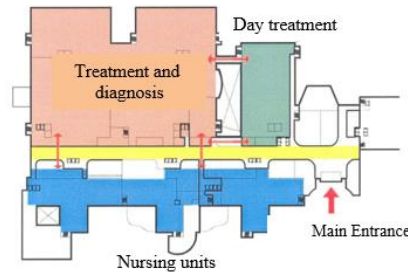
the road as well as the gradual development of the environmental knowledge through different stages. (Sadek, 2015)

Hospitals are large and complex systemic buildings in terms of the different units that they contain. However, it is possible to view these large complex buildings as unclear for patients and visitors who come to the place for the first time or who do not use it continuously. Therefore, the users must be guided from the moment of entry to the building to the direct exit after completing their procedures. Since the difficulty of accessibility leads to emotional stress, tension and discomfort, finding the way is considered extremely significant in health care buildings. (Bates, 2018).

Among the elements that facilitate the distinction of a new environment are the physical aspects that enable people's understanding of the place as well as the ability to naturally direct them to their destination without anxiety or psychological stress. Kenn Lynch in writing the Image of the City 1960 identified a number of studies to analyze the elements of the environmental image of cities. Hospitals have many features in common with cities and urban planning, as they are large buildings containing many different roads that branch out from the main entrance, all roads look similar, and the signs bear complex names for medical departments. Therefore, it is impossible for any visitor to determine the way to the desired place, which causes anxiety and stress for the patients within these spaces. (Wagenaar Cor, 2018) .

▪ **The floor plan configuration:**

The environmental interventions are better used when they are combined to address the different senses (Marquardt, 2011). Hence, in order for the layout of the hospital to be clear, the different hospital elements are grouped into zones according to the homogeneity of services, facilities, tasks and the type of users where the zones are divided in a hierarchy in light of their importance (Martins, 2014). Thus, these zones include similar groups, as the hospital is divided into 3 blocks Fig. 1, a block for treatment and diagnosis, a block for day treatment, and a block of nursing units (Pilosof, 2005), which helps to make the building architecturally legible. This is one of the most important concepts of the environment and one of the important concepts of environmental psychology which helps to build a mental image that facilitates the way-finding behavior (Bates,



2018).

Fig 1: The hospital is divided into 3 blocks (Pilosof, 2005)

Each of the different departments is distinguished from the other with an edge, with an emphasis on a very large entrance hall leading to main roads for each zone where there is an infrastructure for traffic (halls - internal streets - corridors - stairs - elevators) that determine the paths of each zone. Environmental knowledge Fig. 2 ranges through a large number of nodes and paths, and the process of distinguishing between colors, materials and brushes is done for easy movement with the presence of a landmark that the designer uses to define the entrances and the public places. Thus, the basic requirement for success in finding the way, which is the presence of a fixed point as a reference for understanding the surrounding spatial relationships, is achieved through mental maps that contain five elements: landmarks-nods-district-edge-path. (Wagenaar Cor, 2018)

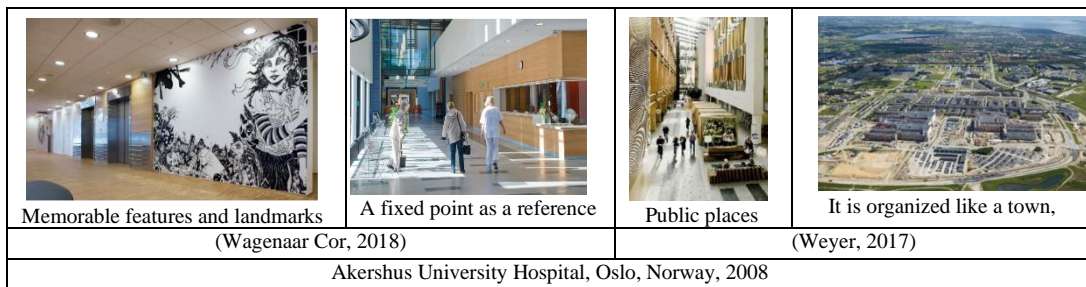


Fig. 2: Environmental knowledge and finding the way

- **Environmental Relationships:**

Environmental relations are among the features that help in the ability to navigate successfully in health care facilities and are represented by the widths of the corridors and their clarity which is important in the ease of navigation with clear signals and signs. One of the features that support way finding is limiting selection by reducing roads, lanes as well as the curves in the nodes. Marquardt explained that long lanes, repetitive elements and changing direction have a negative effect on navigation. (Devlin, 2014)

- **Visual connection:**

In forming the building, it is necessary to focus on the distinction between the horizontal and the vertical, where the multiplicity of floors is a common method in multi-level public buildings. To find the way in the case of multiple floors, there is difficulty in understanding these floors except in an indirect way, which is making a visual reference between floors such as the central atrium. (Devlin, 2014) Therefore, the mall hospital system is used to facilitate the movement process and provide recreational activities .Fig. 3.

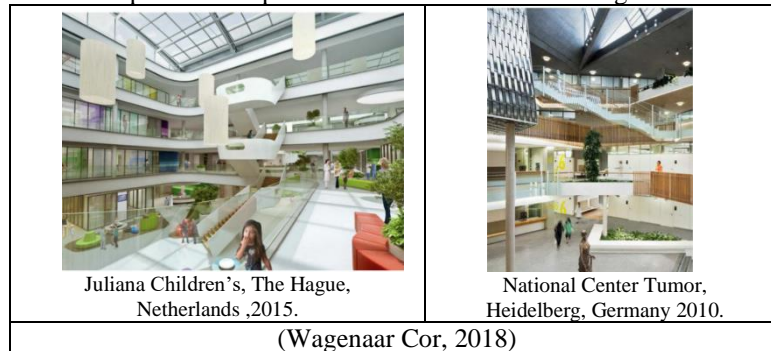


Fig.3: The atrium helps to make visual connection

- **Access clarity:**

It is necessary to use the visual and structural characteristics that affect the ease of the visual access to the different parts of the building from different points. The starting point and the direction can be distinguished through special architectural signs along the way (Sloane, 2003) such as columns, umbrellas, contrastive colors, texture or lighting (Pellitteri, 2011). These signs give a sense of direction and support the ability of the individual to navigate in the external and internal environments. Thus, the visual access approach increases the levels of prediction (Sadek, 2015) and enhances visual perception with a variety of different surfaces through the paths of movement.

3.2. An environment that supports the patient's spirit

It is necessary to provide opportunities to help the patients forget their illness by using positive amusement aspects in the hospital environment and raising their spirit which makes the place joyful even if it is not ideally equipped. This is done through hiding technologies, prioritizing the natural scenes in the hospital and using natural materials as touches of humanistic design to remove the institutional sense with the integration of art and entertainment factors (Bates, 2018). In addition, it is important to provide welfare for the patients and their family in terms of the kind of food and drink required for their condition and the provision of healthcare training program to cope with their new lifestyle. Taking the changes to the patient's requirements into account often has a high positive impact on what happens within the mind, psyche and soul of the human being. The patient's improvement depends on various aspects such as confidence in treatment, vision of illness and self-confidence which the patient gains as a result of the change of the sense of love and fear i.e. love of life, confidence in results, and desire for treatment.

There are many external factors that affect the patient and help improve his condition such as color, texture, view, smell, music, sound, equipment, the use of controllable technology, clarity of the staff, lighting, and other design elements that affect the patient's sense (Sara, 1995). These elements are represented in the following:

- **Nature in hospitals:**

The use of surfaces and spaces that include nature or biophilic design elements inspired by nature such as natural shapes - natural light - natural ventilation - natural sounds of water or birds, natural water and a wide range of colors, imitating nature, charming landscapes and inspiring vibrant gardens has a positive human response. Khooteck Puat Hospital in Yisun in Singapore sets an example of integrating nature into hospital

buildings where the comprehensive use of natural elements helped speed up the patient's recovery. (Makram & Abou Ouf, 2019)

▪ **Principles of Biophilic Design:**

To apply the Biophilic design effectively, some principles are required: (Kellert & Calabrese, 2015)

The continuous participation with nature and the focus on the human enjoyment of nature in order to reach well-being, health and fitness .

- Encouraging emotional attachment to places and their surroundings
- Establishing positive interactions between man and nature
- Encouraging more architectural solutions intertwined with nature.

The relationship between man and nature is divided into 3 sections: naturalness in the void - similarity with nature and the nature of the void. These sections lead to 14 aspects as a tool for the improvement of man in the built environment, as shown in (Table 1). (Makram A. , 2019)




Nature in the space	 <p>Integration of plants, water, and animals into the built environment, particularly with motion</p>	<ol style="list-style-type: none"> 1. Visual relationship with nature: green roofs, living walls, vegetation internal . 2. Non- Visual relationship with nature: climate, sun spots, rough materials . 3. Non-rhythmic eccentric drive: nature noises, water, clouds, shadows. 4 Access to heat and air current changeability: shade, radiant heat. 5. Presence of water surfaces: rivers, fountains, water walls, pond.. 6. Vibrant and diffuse light—light from various angles, , circadian lighting 7. Relationship with natural systems, wildlife environments, daytime patterns
Natural analogues	 <p>One point away from real nature; designs , patterns and materials that bring about nature</p>	<ol style="list-style-type: none"> 8. Biomorphic designs and forms—organic forms, structural systems 9. Material integration with nature—organic forms, structural systems 10. Difficulty and arrangement—fractal designs, sky lines, choice of plants .
Nature of the	 <p>Psychological and physiological human reaction to spatial formations</p>	<ol style="list-style-type: none"> 11. Prospect :views, balconies, 6 m and above focal lengths, open floor plans 12. Refuge :protected spaces, overhead canopies or lowered ceilings . 13. Mystery—curving routes, concealed characteristics, unbroken designs 14. Risk/peril—floor to ceiling windows, water walks, high pathways.

Table 1: Patterns of biophilic design (Makram A. , 2019)

Being connected to nature and enjoying it helps to improve human biological health wellbeing and the performance of the building. The physiological responses resulting from the connection between man and nature (3 categories of association) include muscle relaxation, lowering of blood pressure, and stress hormone. Each pattern of biophilic design has a role in supporting the reduction of stress and ability to recognize and strengthen emotion and mood, (Table 2). (Browning, 2014).

Biophilic Design	Nature in the space:	Natural analogues:	Nature of the space:
Biological Responses	<ul style="list-style-type: none"> -Lowered blood pressure and heart rate - Reduced systolic blood pressure and stress hormones - Positively impacted on heart rate, systolic blood pressure and sympathetic nervous system activity 	Positively impacted perceptual and physiological stress responses	- Reduced stress
STRESS REDUCTION	<ul style="list-style-type: none"> - Positively impacted comfort, well-being and productivity - Reduced stress, increased feelings of tranquility, lower heart rate and blood pressure - Positively impacted circadian system functioning - Increased visual comfort 		

COGNITIVE PERFORMANCE	<ul style="list-style-type: none"> - Improved mental engagement/ attentiveness, - Positively impacted on cognitive performance - Observed and quantified behavioral measures of attention and exploration - Positively impacted concentration - Improved concentration and memory restoration - Enhanced perception and psychological responsiveness 	<ul style="list-style-type: none"> - Decreased diastolic blood pressure -Improved creative performance 	<ul style="list-style-type: none"> - Reduced boredom, irritation, Fatigue - Improved concentration, attention and perception of safety .
EMOTION, MOOD & PREFERENCE	<ul style="list-style-type: none"> -Positively impacted attitude and overall happiness - Perceived improvements in mental health and tranquility - Improved perception of temporal and spatial pleasure - Observed preferences and positive emotional responses - Enhanced positive health responses; Shifted perception of environment 	<ul style="list-style-type: none"> Observed view preference -Improved comfort - Observed view preference 	<ul style="list-style-type: none"> -Improved comfort and perceived safety - Induced strong pleasure response - Resulted in strong dopamine or pleasure responses

Table 2: Biophilic design categories & Biological Responses (Browning, 2014)

All biophilic elements are used at all levels, including the level of the building, group of buildings, streets, etc. to reach the easiness in natural daily communication and attain a calm and happy life. (Makram A. , 2019).

▪ **Art in hospitals:**

Art and humanities express an aspect of human health that is difficult to reach or quantify, as it promotes and encourages the presence within a health care environment and aims to achieve a set of wonderful resources, including communication, hope, understanding, compassion, fun, acceptance and peace. (Palmer & Nash, 1991) Art also has an important goal in improving health and health care, as it provides positive distractions, support and participation in the healing process. Art is an integral part of the world that is found in nature, music, colors, scenes and smells that contribute to the perceptions and understanding of the creative self, self-esteem, general health and well-being. (Pierce, 2019)

The use of art has emerged in the health care movement since the late 1990s. It contributes to the restoration of health on the physical, mental, emotional or spiritual level (Lambert P. D., 2016). Furthermore, it participates in providing better health, achieving well-being and improving the experience of patients, service users and employees alike. In addition, It has a great impact on patients through psychological responses to hue, brightness, saturation, and colors that evoke high levels of pleasure and a state of calmness. While patients often prefer paintings that depict natural scenes for their positive emotional response, some patients may not get the necessary comfort form abstract art. (Lankston, 2010) .

By integrating art into healthcare design, Misty Chambers introduces a holistic approach to healthcare design, integrating art with architecture to meet the needs of patients, their families, visitors, and caregivers by creating opportunities for visual art and places for the performing art. Chambers explains that integrating art in planning, design, and construction for health care buildings provides an environmental basis to support patient’s healing, and through this integrated art, the built physical environment has the most positive impact. (Lambert P. D., 2016)

Janice Palmer (2001) pictures 3 simple and basic principles of aesthetics and creativity that nurture art in the health care movement:

- Bringing beauty within the surrounding environment
- Community participation by attending its celebrations
- Heart touching aspects

These three goals represent art and health. They are divided into the following branches:

Creating therapeutic art: It is known by using art and processes of creative activities such as music, drama, poetry, the art of using colors, color pictures, landscapes, photography and artworks, windows, gardens, ideas of simplicity and daylight all of which are concepts of charm and create more natural and positive new environment that promotes health and well-being and encourages treatment. (Pierce, 2019)

Environmental Art: It is an important branch for architects and designers of health care buildings. It includes remedial gardens and artistic performances that permeate the internal and external environment of the building.

Therapeutic gardens are courtyards, roofs and landscapes which can serve as sites for individual and group art programs and creative art treatments.

Nonetheless, carefully integrating art into the design of the Healing Gardens greatly amplifies the physical, psychological and spiritual gains. Annette Ridenour suggests that all garden elements can be viewed as art. Corridors, furniture, walls, gates and other elements are part of the artistic beauty of the garden, such as sculptures, fountains and walls.

Permanent display is one of the most common art aspects in the health care program. It includes paintings or sculptures and possible displays of interest to the community and is found in halls and public places.

Participatory Art: The HealthCare Participatory Art Department represents a range of bedside activities and shows in public places such as lobbies, waiting rooms, and a wide range of collaborations with the local community. Bedside activities are a major focus of art programs in health care professionals and in several organizations such as art carts and also performers who go on tours with the patients. These activities include music (listening and interactive), dance, movement, arts and crafts activities, storytelling, drama, and writing activities for patients and their families. Patients may participate in visual art and handicrafts as well as performances. (Lambert P. D., 2016)

3.3. An environment that supports care, kindness and respect

Humanistic design focuses on healing and nourishing the body and soul to provide a healthy environment for patients to enjoy care, compassion and respect. Providing requirements that raise the feeling of care and contribute to improving treatment consists of the following:

- **Social relations:**

Kahn (1979) defines social support as an intentional human interaction that includes one or more of the following elements: (1) Impact, which is what a person experiences in feelings of appreciation, love, admiration, and respect. (2) Emphasis, which reinforces and influences the individual in his way of making decisions (3) Assistance, which is help with things or money, or the fulfillment of requirements. (Rantanen, 2004) In order to provide positive social relations between patients, the requirements of care and those who can give the care, as well as those who encourage the patient during the healing process to return to a normal life, the following must be provided:

- **Charity spaces :**

These spaces are a part of care that achieve environmental, functional and aesthetic quality and increase the quality of social relations. They are generally intended spaces for use within the hospital that create urban context in which patients practice their activities themselves. Moreover, family and friends are no longer considered as visitors but rather as a support for patients during treatment. (Setola & Borgianni, 2016)

Providing social interaction spaces and social support opportunities is important for health and prosperity. Therefore, it is necessary to provide a space in patient rooms for families and overnight stays, as 49% of all family visits to patients in health care facilities take place in patients' rooms as family members and relatives spend most of the hospitalization time at the patient's bed. In addition, close family members have a great impact on the safety and mental health of patients due to their care and support. However, socially isolated people suffer from higher rates of illness and less indicators of recovery than those who receive social support.

The social support spaces are comfortable and enjoyable waiting areas with easy access to food, drink, phones, breaks, and places that can be accessed for sitting and socializing, such as gardens with seating areas that encourage social rapport.

The importance of social support lies in the tangible assistance and care and emotional support that a person receives to achieve better health and less stress. The design that enhances social support combines the convergence of public spaces and home environment with both the comfort and friendliness that these spaces provide. Social interaction through these spaces can be achieved for the individuals to bond and obtain inspiration and support from others. This positive social interaction, whether parental, family, or social support, has an important role in helping patients recover from illness. In addition, the level of social interaction increases by providing the halls and waiting rooms with comfortable and arranged furniture in flexible groups. It has been proven that the design of seating arrangements and their patterns has a strong control over the amount of social interaction between patients in the patient's environment and also in the design of treatment gardens Fig.4 that encourage conversations and social rapport between groups of patients and visitors. (Makram, Abou Ouf, & Assem, 2019)



Fig.4 : Social relations (Makram, Abou Ouf, & Assem, 2019)

▪ **Quality Care**

- **Peace and satisfaction of patients**

The quality of the care that the patient receives makes him feel reassured and safe, reduces tension and fear, preserves the safety of the patient and reduces the risks of infection within the hospital. This is done by providing air quality and good ventilation systems where they play an important role in influencing the concentrations of pathogens in the air and providing single more than multi-family rooms. The single-bed rooms have many advantages in terms of the lowest rates of infection transmission with the provision of wash basins and disinfection for the staff in the patients' rooms to prevent the transmission of the infection for the safety of the patient. Furthermore, increasing the space of the single room helps to benefit from the support of the patient's family and reduces the patient's problems. Single rooms maintain the patient's confidentiality and privacy. (Ulrich, Zimring, Joseph, & Choudhary, 2004) The flexibility of the single rooms and their ability to meet the patient's requirements help reduce the number of transfers within the hospital which has a great impact on the patient's comfort and reduces the length of stay in the hospital. (Hughes, 2008)

- **Communication and sharing:**

Prompt and direct communication between the medical staff and the patients by reducing the distance of access provides a good follow-up of patients and facilitates visual communication through the design of the nursing unit layout, where patients' rooms in radial units help to centralize the nursing units to gain the patient's satisfaction with the service. Good communication of the staff helps reduce the anxiety of the patient and the family. It works to increase the time of care for patients by saving the time lost in the staff transfer (Makram, Abou Ouf, & Assem, 2019) . The importance of the ability of visual access to patients enables good care. In the designs of the 21st century, there is a cavity with a glass window so that nurses can see the patient and follow him without opening the door or waking him up. Since the vision means good lighting by increasing natural light, there are large windows in every room. Fig. 5

Granting patients the participation of doctors in decision-making by respecting their needs and preferences, providing medical care information and having a laptop computer in every room so that the patient can access information easily (Hughes, 2008)

Furthermore, patients practice their daily activities that make them inseparable from the outside world of the home, office, friends and family by providing the necessary technology for audio-visual communication. (Makram, Abou Ouf, & Assem, 2019)

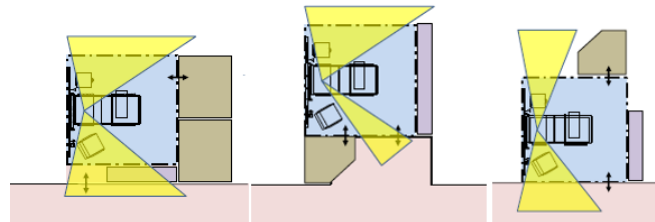


Fig.5: Layout in terms of viewing and delighting potentiality (Joarder, 2011)

- **Hospital serenity:**

As hospitals are excessively noisy in equipment, devices, and different treatment methods, this noise causes the patient to stress and sleeplessness. Therefore, setting strategies to calm the hospital is one of the critical points for the care and comfort of patients by eliminating noise sources such as using silent summons, identifying alarm devices outside patients' rooms and using sound absorbing ceilings and floors with other settings that reduce noise for the benefit of the patients. (Ulrich, Zimring, Joseph, & Choudhary, 2004)

4. Results and Conclusion

The research concludes to a framework that supports the mental emotional and physical needs of the patient within the humanistic design environment of hospitals. This framework Fig. 6 is based on three principles which are divided into three strategies. The first principle is physical comfortable which depends on the strategy of special and cognitive awareness. the second principle is positive amusement which is based on the strategy of supporting the patient spirits. In addition, the third principle is reinforcement stimulation which revolves round the strategy of providing care, kindness and respect for the patient within the humanistic design environment of hospitals.

These strategies and principles contribute to the development of three methods of humanistic design environment which are functional comfortable, aesthetic and joyful as well as social, communication and safety.

The achievement of such environments within the humanistic design of hospitals enhances the healing support of patience which contributes to reducing nervousness and pressure, depression as well as tension and anxiety. Therefore, the development of such a humanistic design environment raises the opportunity of patients to return to their normal everyday life. This opens the way for more methods and strategies that support the human environment for healthcare facilities and help the architect in the humanistic design process.

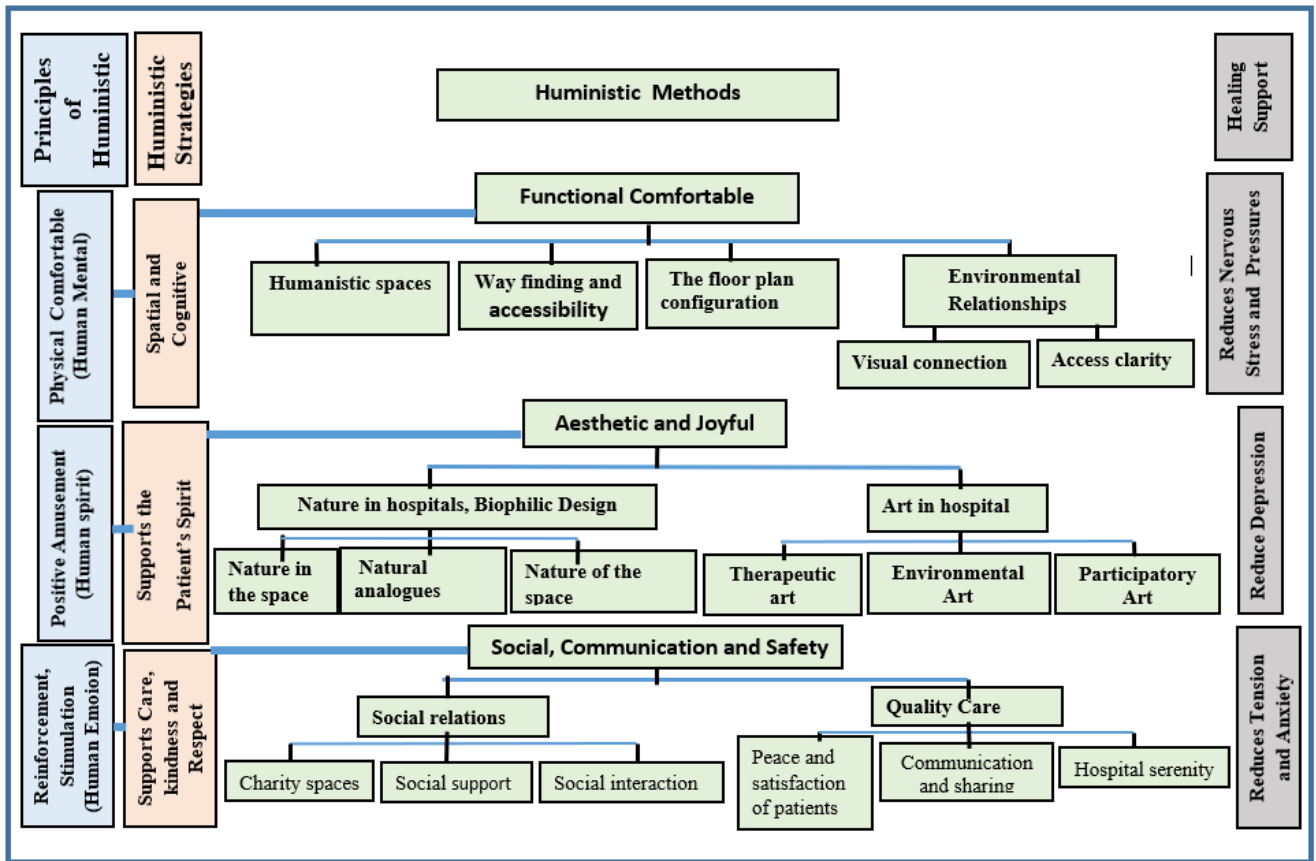


Fig. 6: Conceptual framework for the humanistic design environments of hospitals

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