

Architecture As Meaningfulness in Health Care

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ABSTRACT

In the current medical framework, architecture goes beyond functionalism to construct the environment. The purpose of this study is to discuss how architecture can become an important topic in the medical environment by focusing on specific activities that improve the medical care of patients and their families. Through a comprehensive literature review, review of research literature, and inclusion of expert opinions, this article offers a variety of perspectives on the interaction between structure and content in healthcare. This article examines the contribution of key design elements that help create the atmosphere of safety, harmony and connection necessary for the healing process. This study demonstrates the need for natural products, including the use of appropriate lighting, biophilic design or sustainable design in medical facilities. Accordingly, this article examines patients in central and transitional settings. These elements are identified for their contribution to creating an environment that enhances patient comfort, safety, and health while promoting efficiency and improving overall healthcare.

In addition, this article highlights the importance of integrating technology and safety standards into hospitals to increase efficiency, reduce ecological impact, and create spaces that represent today's treatments.

KEYWORDS- Architecture, Meaningfulness, Healthcare, Design Elements.

1. Introduction:

In recent years, there has been a significant shift in our thinking about the role of architecture in healthcare. Hospitals and clinics, traditionally understood as purely medical facilities, are being recognized as healthcare facilities with the potential to improve patient experience and benefits. This evolving need has led to an interest in how hospital-specific content can be incorporated to not only support healing, but also increase relevance for patients, staff and visitors.

When we discuss the meaning of architecture, we often focus on ideas; what the building represents or symbolizes in terms of its function or intended message. But this narrow view often overlooks the deeper, more fundamental meaning inherent in architectural buildings. Beyond visible elements such as walls, floors, and ceilings, architecture has a spiritual or transcendental quality that transcends physical or practical qualities.

The World Health Organization (WHO) recognizes that the design, performance and maintenance of buildings have a significant impact on the health of their occupants and can cause or exacerbate disease. Exposure to insufficient architectural parameters and indicators that affect indoor air quality (IAQ), thermal comfort, noise, lighting, atmosphere and ionization, among others, condition people's quality of life in the short, medium and long term. In the wake of the recent global public health crisis, the timely and responsible generation of theoretical, practical and interdisciplinary knowledge about the

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properties of buildings that provide positive sensory experiences as well as physical and mental health outcomes is timely. The hypothesis of this article is that architecture is no longer defined only by visual or geometric parameters, but also by other dimensions including environmental, cognitive, psychological and physiological aspects, affecting people's comfort, well-being and physical and mental health. This paper aims to demonstrate this proposition, and this is the main objective of this work.

To achieve this, the methodology is mixed, first developing a theoretical character and then defining an analytical framework with several examples demonstrating this new concept of healthy architecture. On the one hand, the current state of this research will be defined after examining the main related literature according to the fundamentals of critical review: search, evaluation, analysis and synthesis. On the other hand, it uses empirical experience from several projects, buildings and installations to help contextualize the problem and obtain certain patterns that serve as the basis for the results obtained.

2. The Impact Of Architectural Design On Patient Well-Being:

The significant influence of architectural design on the health of patients in healthcare facilities is increasingly recognized. Because patients spend so much time in hospitals and clinics, the design of these facilities plays an important role in influencing their experience and outcomes.

One of the main ways a building affects patient health is by reducing stress. A well-designed healthcare environment takes into account factors such as lighting, color schemes and spatial layout to create a calming and relaxing environment. For example, natural light has been shown to have a positive effect on mood and health, so architects often use large windows and bright skylights to provide patients and spaces with maximum light throughout the day. In addition, the use of soft, neutral colors and natural materials can create a feeling of warmth and calm, help reduce stress and promote relaxation.

Comfort is another important aspect of patient health influenced by architecture. Patients who feel comfortable in their environment will feel comfortable and safe during their hospital stay. Designers achieve this by creating ergonomic and comfortable spaces for rest and recovery. For example, patient rooms can be equipped with reclining beds, comfortable chairs and personal items for comfort and convenience. In addition, the emphasis on acoustics and privacy helps to create a quiet and private space where patients can rest undisturbed.

Architecture also plays an important role in promoting healing during treatment. Architects help improve patient outcomes and shorten recovery times by creating environments that support the body's healing processes. For example, the layout of a hospital wing can be designed to facilitate access to medical services and resources, reducing the need for patients to make strenuous journeys to and from home. Additionally, incorporating landscapes, art, and other biophilic materials can provide opportunities for patients to relax and connect with nature. It has been shown to improve well-being and quality of life.

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3. Crucial factors for human health:

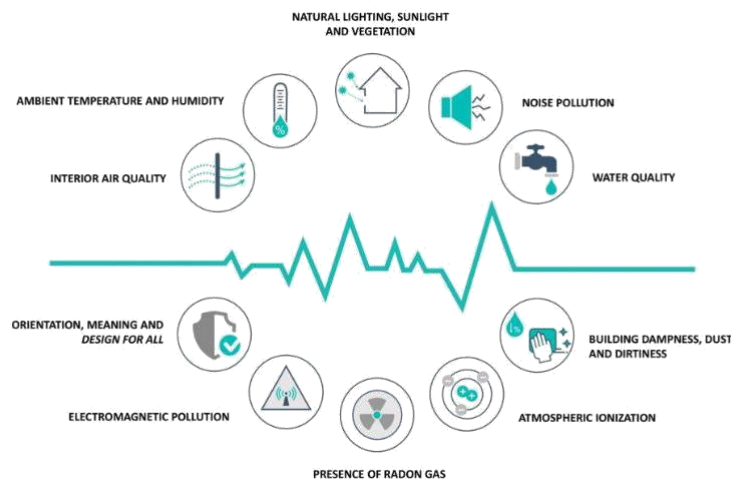


Figure 1. A Decalogue of healthy architecture

- **Indoor Air Quality (IAQ)** – Maintaining good indoor air quality is essential to our health. One effective way to achieve this is to ensure proper ventilation in all areas. When we breathe, our nose, eyes and skin sense the air around us and determine whether it is fresh and pleasant or unpleasant. To ensure good air quality, it is essential to use building materials that release few harmful chemicals and avoid pollutants such as lead, asbestos and some chemicals that can be harmful when inhaled.
- **Ambient temperature and humidity** – Maintaining the correct indoor temperature and humidity is essential for our comfort and well-being. Our bodies rely on a stable balance of temperature and humidity to function properly. To ensure indoor comfort, it is important to maintain consistent temperature and humidity levels throughout the year. However, ideal levels may vary depending on the climate and geography of each location. Therefore, it is important to establish specific guidelines for each area to ensure optimal comfort.
- **Natural lighting, sunlight and greenery** - It is important for indoor spaces to have enough natural light, but not too much to cause discomfort. Sunlight is beneficial for our mental and emotional well-being, so it is good to have spaces that receive sunlight for several hours a day. In addition, it is useful to have a view of outdoor green areas or vegetation from indoor spaces, as it can positively affect our mood and overall sense of well-being.
- **Noise pollution** – It is important to control unwanted noise pollution by protecting and isolating indoor rooms from outside noise. It is also necessary to monitor internal sources of noise that can be irritating, such as mechanical devices, electrical appliances, air conditioners or perhaps a neighbour rehearsing for an upcoming concert.
- **Water quality** – Impurities must be removed from drinking water as much as possible. For this, in addition to the measures already considered by suppliers, it is desirable to install home cleaning systems. Stagnation of water in sewers, buildings and outdoor spaces, as well as stagnation of water in wells, puddles, etc., which serve as a breeding ground for pests, must be prevented. Since it is

necessary to reduce the use of pesticides and chemical products in pest control, it is better to avoid attracting them by removing the place where they live if possible.

- **Moisture and Dirt in Buildings** - It is essential to prevent the accumulation of moisture caused by drafts, condensation or infiltration, as its existence encourages the growth of mold and

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bacteria which are harmful to health. Materials that can cause adverse reactions and allergies due to their properties and distribution must also be eliminated.

- **Atmospheric Ionization** - Clean air is usually negatively ionized and a reasonable percentage of negative ions contributes to the feeling of well-being. The air in cities is normally charged with positive ions, similar to the air inside buildings. The concentration of negative ions in the air is reduced by air flowing through metal ducts, tobacco smoke, static electricity produced by synthetic fibers and human activity. This condition is associated with discomfort, malaise, stress and loss of mental and physical capacity. So maintaining enough negative ions in the environment is another factor to consider.
- **Presence of radon gas** - Radon (Rn) is a natural gas produced by the decay of radium in the radioactive decay chain of uranium-238. It is present in the earth's crust and is soluble in water, so radon can be found anywhere, although it is most commonly found in granite soils and in soils containing uranium ore. Building materials such as phosphogypsum or blocks made from pieces of granite can also produce radon. The gas penetrates to a maximum height of one meter by natural diffusion through joints between materials, cracks or through the passage of pipes, and therefore it is necessary to prevent its concentration. It is also essential to comply with the safety standards set by regulations for fire safety, carbon monoxide detection, etc.
- **Electromagnetic Pollution** - Although numerous studies have been conducted regarding electromagnetic fields (EMF), it has not yet been possible to demonstrate using scientific evidence that the effects of long-term exposure to fields from high voltage power lines, telephone antennas, household electrical appliances and/or workplace equipment are the cause of fatigue, stress or SBS-related depression. In any case, as a precaution, it seems important to plan and design this essential current infrastructure at proper distances from residences and workplaces, as well as having the necessary insulation.

4. Contemporary Approaches to Healthy Architecture:

Architecture is no longer solely defined by visual or geometrical parameters, but also by other factors such as environmental, cognitive, psychological, and physiological aspects. This means that buildings are not just seen but also perceived by the human body through various indicators and emotional factors. In simpler terms, architecture is not just about how it looks; it's about how it affects people's health and well-being.

4.1 The Rise of Health-Oriented Design:

In the 1950s, Dr. Jonas Salk, who developed the polio vaccine, emphasized the importance of creating spaces that encourage creativity, inspiration and the flow of knowledge. To bring his vision to life, he commissioned architect Louis I. Kahn to design the Salk Institute for Biological Studies in San Diego, California. Completed in 1965, the institute is not only an architectural masterpiece, but also the first example of the intersection between neuroscience and architecture.

Kahn's design was based on the idea of providing optimal conditions for intellectual and physical well-being, influenced by an understanding of how the human brain works. The institute has been carefully planned to stimulate the mind and encourage collaboration between researchers, with spaces designed to maximize natural light, encourage openness and facilitate communication. Through its innovative

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design, the Salk Institute embodies the idea that architecture can profoundly influence human cognition and creativity.

The field of neuroarchitecture examines how the design of spaces affects people's behavior and mental well-being. By studying the interaction between the built environment and the human brain, neuroarchitecture seeks to understand how different aspects of architecture affect emotions, stress levels, memory and learning. For example, some spaces may promote feelings of calm and relaxation, while others may induce stress or anxiety.

This interest in the effect of space on human well-being extends beyond architecture and into fields such as sociology and psychology. Sociologist Aaron Antonovsky introduced the concept of "salutogenesis," which focuses on understanding the factors that promote health and well-being.

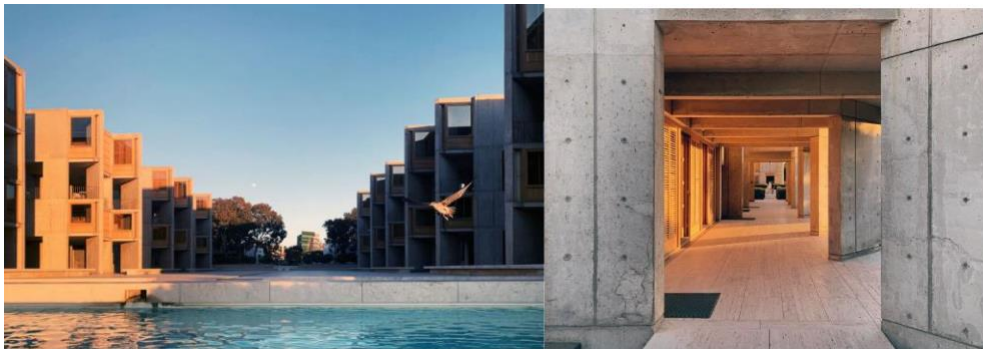


Figure 2. Salk Institute for Biological Studies, San Diego (California, USA)



Figure 3. Louis Kahn's creation consists of two mirror-image structures that flank a grand courtyard.

Understanding how architectural spaces affect people emotionally and cognitively is a complex challenge. To tackle this, research and projects focused on individuals with cognitive impairments, such as dementia, are particularly crucial. These initiatives not only improve the quality of life for those with cognitive deficits but also offer valuable insights that can benefit society as a whole.

Interest in studying the needs of individuals with dementia emerged in the US during the mid-1960s, leading to the development of new care models. Instead of solely focusing on treating symptoms, these models prioritized providing specialized care that addressed the cognitive and social needs of patients. This approach emphasized creating personalized environments that enhanced residents' well-being.

The demand for specialized care centers prompted the publication of architectural practice guides, offering technical solutions for designing environments tailored to individuals with dementia. These guides outlined criteria for spatial organization, including safety, orientation, functionality, integration, and personalization.

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While some of these criteria were already considered in buildings for individuals with physical or sensory disabilities, the novel contribution was the introduction of concepts like integration and personalization based on subjective perceptions of space. These concepts aimed to support autonomy and independence by providing optimal sensory stimulation and facilitating social connections with family members.

4.2 Emotional Response to Architectural Design:

While basic building codes have always included principles of health, safety and accessibility, there has been a recent shift towards incorporating emotional and cognitive aspects into architectural design. This shift is evident in the construction of specialized buildings such as cancer treatment centers, Alzheimer's facilities, and palliative care units that focus on addressing the physiological, cognitive, and emotional needs of their users.

These specialized buildings serve as case studies that demonstrate the importance of considering emotional, psychological and physiological factors in architectural design. For example, palliative care units and Maggie's Centers show the emotional impact of architecture, while residences for people with Alzheimer's disease emphasize the cognitive impact. In addition, various installations demonstrate the physiological effects of architectural design on human health.

Overall, these case studies provide valuable insights into what constitutes healthy architecture today and highlight the importance of designing spaces that promote well-being and enhance the quality of life for all individuals.

Palliative care units (PCUs) in France, also known as Unités de Soins Palliatifs (USP), are specialized healthcare facilities designed to provide comfort and support to terminally ill patients and their families. The first USP, named Paul Brousse, was built in Villejuif in 1988 by Avant-Travaux architects.

In designing these units, the architects faced a significant challenge: to create an environment that did not constantly remind patients of their approaching end of life. To address this, they focused on creating a space that prioritized the well-being of patients and their families. They incorporated elements that allowed individuals to personalize their surroundings and fostered a sense of individuality and belonging.

In addition, the USP's architectural design emphasizes symbolism and evokes emotional responses from those who visit or reside in these spaces. This approach helps create a supportive and reassuring atmosphere for patients and their loved ones.

In 2006, renowned Japanese architect Toyo Ito further advanced the USP concept by designing a unit at the Cognacq-Jay Hospital in Paris. His design contributions further refined the PCU model and

emphasized the importance of creating environments that prioritize the physical, emotional and psychological well-being of patients receiving palliative care.

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Figure 4. Hôpital Cognacq-Jay USP, Paris, France

4.3 Hygienic Solutions in Buildings:

The need for sanitation solutions in buildings and homes has become apparent due to the ongoing challenges posed by diseases such as cholera and tuberculosis. Sunlight, cleanliness, and rest were found to be effective agents against tuberculosis, leading to the design of buildings to maximize these factors. Hospitals were built with large windows to allow plenty of sunlight, while sanatoriums had spacious terraces. In addition, houses were built above the ground to prevent moisture, and furniture was designed to prevent the accumulation of dust and bacteria.

Solving these health problems was not the primary goal of the modern architectural movement, but it nevertheless influenced its development. The movement favored aesthetics over purely functional considerations in order to create a new architectural style. Central to this movement was the idea that buildings should express their intended use and meet the needs of the mass population. The emphasis was on creating standardized designs that could meet the needs of a wide audience rather than individualized solutions.

When designing medical buildings, architects focused primarily on functionality and treated them as machines to efficiently address medical needs. As a result, these buildings lacked warmth and failed to meet people's emotional needs. They prioritized technical features such as hygiene, accessibility, and safety based solely on disease symptoms and treatments.



Figure 5. Healthcare architecture with terraces and sunbathing areas for patients, Paimio Sanatorium, Paimio (Finland).

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This approach led to the creation of impersonal spaces with sterile surfaces, colorless interiors and long isolated corridors. Natural light was often absent, replaced by artificial ventilation and minimalist rooms. While these buildings were effective in treating patients, they lacked identity and meaning and did not consider the emotional well-being of the residents.

4.4 Impact of the Environment on People:

In response to the growing need for specialized care for individuals with Alzheimer's disease, architects began designing residences tailored to their unique needs. One notable example is the Corinne Dolan Alzheimer Center in Cleveland, Ohio, designed by Taliesin Associated Architects in 1985. The center included spaces for social interaction and memory stimulation to create a homelike environment for residents.

Another major development was the Woodside Place residential complex in Oakmont, Pennsylvania, designed by Perkins Eastman in the late 1980s. This complex introduced innovative design principles, including small-scale buildings with well-planned layouts and a focus on creating an atmosphere of home. The architecture incorporated familiar elements such as gabled roofs, specific types of windows and doors, and chimneys to evoke feelings of familiarity and comfort.

Similarly, the Boswijk residence in Vught, Netherlands, built by EGM Architects in 2010, followed a similar approach. It featured small, personalized homes arranged around shared green spaces that fostered a sense of community and connection between residents. In addition, these residences included facilities for caregivers and support services such as medical centers and research areas. Overall, these examples show how architecture can positively impact the well-being of individuals with Alzheimer's disease by creating a supportive and soothing environment that improves their quality of life.



Figure 6. Woodside Place, Oakmont, Pennsylvania (1991).

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5. Promoting Healthy Architecture:

The key takeaway from the previous case studies is the creation of environments that promote health and well-being. These spaces are designed to be easily understood and familiar, helping to improve people's emotional state. They offer a sense of identity and comfort, making users feel welcomed and relaxed, whether they are healthy or unwell. Additionally, the approach of physiological architecture considers the impact of various environmental factors such as electricity, sound, magnetism, and temperature. This approach acknowledges that contemporary spaces are influenced by these factors, which can be measured and mapped to better understand their effects on occupants.

6. Conclusion:

Old architecture in hospitals often prioritized utilitarian functions over the well-being of patients and staff. These buildings typically featured a sterile institutional design with long corridors, small windows and minimal natural light. Patient rooms were often cramped and lacked privacy, contributing to feelings of discomfort and isolation. Additionally, ventilation and air quality were often poor, and access and aesthetics were limited.

In contrast, modern health-oriented architecture in hospitals places great emphasis on creating a healing environment that supports the well-being of patients, staff and visitors. These buildings are designed to be welcoming and calming, with plenty of natural light, spacious interiors and access to outdoor green spaces. Patient rooms are designed for comfort and privacy, often featuring larger windows, adjustable lighting and flexible furniture arrangements. In addition, modern hospitals prioritize sustainability and environmental health, incorporating features such as energy-efficient systems, green roofs, and recycled materials.

Hence, the difference between old architecture in hospitals and modern health-oriented architecture:

S.no	ARCHIECTURAL ASPECTS	OLD-STYLED HEALTH CARE ARCHITECTURE	MODERN HEALTH ORIENTED ARCHITECTURE
1.	Design philosophy	Traditional hospital designs often focused primarily on functional aspects, such as housing medical equipment, facilitating staff workflows, and providing basic patient care.	Modern hospital designs prioritize creating healing environments that support the physical, emotional, and psychological well-being of patients, staff, and visitors.
2.	Aesthetics and atmosphere	Hospitals with old architecture used to have a rather sterile and institutional aesthetic characterized by bland colours,	It emphasizes aesthetics and atmosphere to create spaces that are pleasant, soothing, and supportive. This can include

			the
		uniformity and utilitarian	use of natural materials,

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		elements. The emphasis was on efficiency rather than creating a welcoming or pleasant atmosphere.	calming colours, artwork and greenery to improve the overall atmosphere and reduce stress for patients and staff.
3.	Patient experience	Patient rooms in older hospitals were often small, cramped and lacked privacy. The emphasis was on maximizing bed capacity rather than ensuring individual comfort or dignity.	Modern hospitals prioritize the patient experience by designing spacious, comfortable and private rooms that promote rest, recovery and healing.
4.	Connection with Nature	Older hospital buildings typically had small windows and limited access to natural light and views outside. Patients and staff could feel cut off from nature and confined within the building.	Modern health-oriented architecture incorporates ample natural light and views of nature to create an uplifting and therapeutic environment.
5.	Environmental sustainability and health	Traditional hospital designs often overlooked sustainability and environmental aspects, resulting in buildings with high energy consumption, waste generation and environmental impact.	Modern hospitals prioritize environmental sustainability and health by integrating green building principles, energy-efficient systems and eco-friendly materials.

Table 1. Difference between old architecture in hospitals and modern health-oriented architecture.

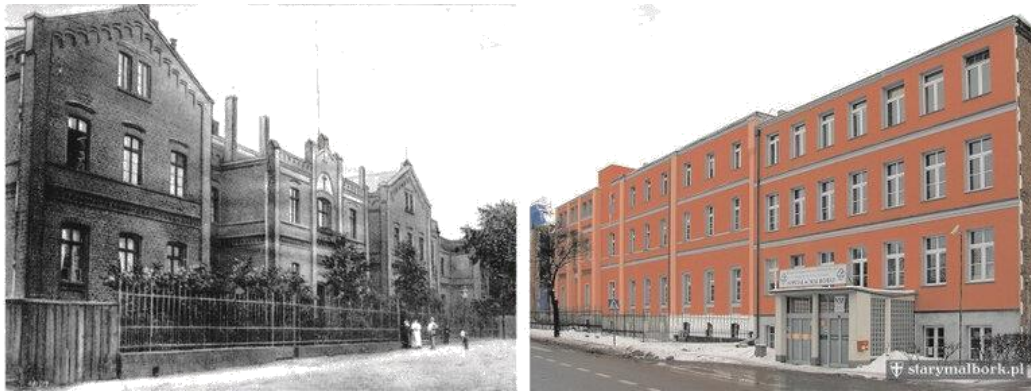


Figure 7. Sketch of Evolution of County hospital in Malbork.

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